AVIATION WEEK

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OCTOBER 4, 1948

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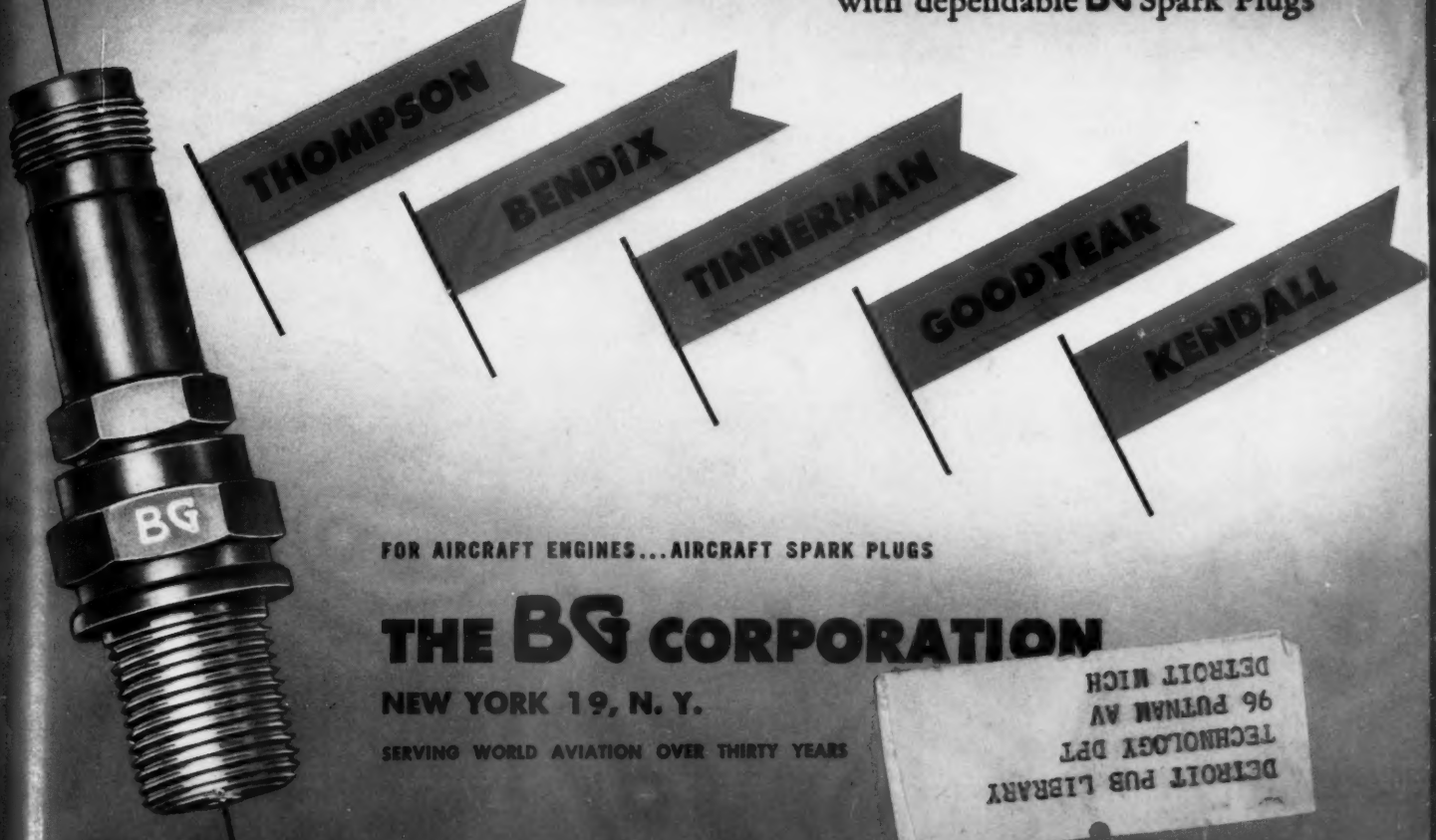

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Vol. 49, No. 14

AVIATION WEEK

October 4, 1948

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A D M A

NEWS SIDELIGHTS

Convairs for T-29

Air Force may not announce it for some time but Convair got the nod over the Glenn L. Martin Co. in the hot competition for the USAF T-29, twin engine trainer contract. Convair's contract will be about $30,000,000 for 36 Convair Liners including modifications for bombardier and navigator training.

The Convair award represents a triumph of USAF procurement people over the Training Command, which wanted an entirely new design competition for the twin-engine trainer to meet its detailed specifications. Procurement brass said it would be simpler to buy modifications of twin-engine transports already in production.

Small Fields Losing Out

Practical application of the recently established CAA airport policy, handed down to the regions virtually kills further airport assistance to small fields in the 1949 and 1950 programs, according to interpretations in Washington.

The policy assigns top priority to airport projects providing facilities needed for the effective uses of air navigation aids planned in the SC-31 report. Third priority is for fields to serve feeder lines and smaller types of aircraft.

With only a limited amount of funds for airport aid made available by Congress it looks as if there is only enough for priorities one and two and that the small fields will be down scraping the very bottom of a rather completely emptied barrel.

National Precedent?

CAB investigation to determine whether National Airlines routes should be parcelled out to other airlines has the scheduled air transport industry worried. Most of the big airlines have been bitter against National since it broke the airlines' united front against the New York Port Authority and bolted to Idlewild last month and would shed few tears over National's cannibalization.

But they are fearful that the Board action in the National case may establish a precedent for it to proceed with the long-talked about general revision of the domestic route structure. Eastern Air Lines is particularly worried over what Pan American may get out of National's disintegration.

Supersonic Stew

Watch for some Pentagon fireworks over the supersonic security policy laid down last fall by Defense Secretary James V. Forrestal. The Forrestal policy classified flights over Mach .8 as confidential ranging up to top secret classification for supersonic performances. Since then the Air Force has publicly announced flights of the Bell X-1 at from Mach 1 to Mach 1.3 and a new world speed record at Mach .87 for the F-86A.

Navy, more than a little irked over the USAF supersonic headlines while it hewed to the Forrestal line, will demand an accounting and probably pry loose some high speed stories on its Douglas Skystreak and Skyrocket, both capable of slipping past Mach 1.

Compound Problems

Impressions of the daily press that the new compound engines are "America's answer to British turbojet leadership" are doomed to disappointment. The use of a turbine compounded to a reciprocating engine bridges only one of the many gaps between the piston and gas turbine engine.

By utilizing the energy of hot exhaust gases for power, a reduction in fuel consumption is attained that makes an important contribution to the problem of aircraft range. But the new engine suffers from the same old complaints against the reciprocating engine: It uses a propeller for conversion of power to thrust and that puts a subsonic ceiling on its potentialities.

Its great weight, complexity, low power, altitude deficiency, awkward shape and size and its dependence on detonation-dampening fuels categorizes the reciprocating engine as a power plant at the end of its useful development in the high power type. The compound engine is no answer to the turbojet anyway you look at it.

Mail Probe Off

Don't expect any investigation of air mail pay "subsidies" by Senator Homer Ferguson's (R. Mich.) Senate committee before the November elections.

Republican high command cancelled the scheduled investigation because it might revive the TWA-Pan American fued and re-open the bitter controversy between Howard Hughes and Senator Owen Brewster (R., Me.). Republican leadership is determined to keep Brewster in the background until after the election.

Red Test Center

Russia has built its equivalent of U. S. Wright Field and Muroc flight test centers at Ramenskoye, a wartime tactical airfield about 26 miles southwest of Moscow. Development of the Ramenskoye flight test center is strictly a post-war project begun after the end of the German war.

However Russians have not moved their basic aeronautical research facilities back into western Russia following their wartime exodus from the Moscow area.

Credit Brewster, Hinshaw

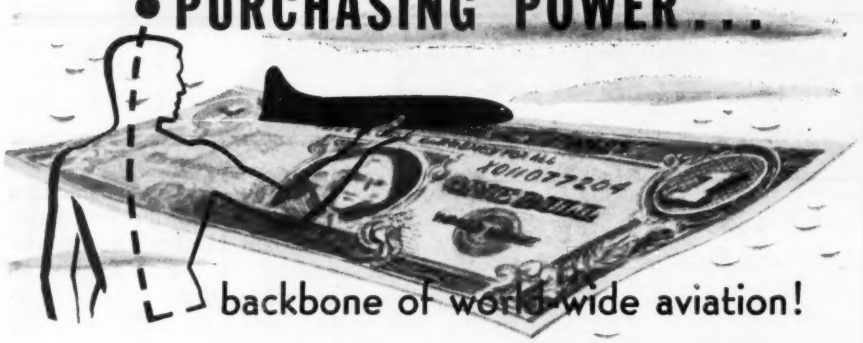
Credit for the attention given aviation by Washington the past two years goes largely to Maine's GOP Sen. Owen Brewster and California's GOP Rep. Carl Hinshaw.

Last year, when a series of spectacular air crashes threatened to send air traffic into a nosedive, Brewster and Hinshaw pushed for hearings on air safety before the Senate and House Interstate and Foreign Commerce Committees. The industry was critical at the prospect of additional accident publicity. But the hearings, focusing congressional, government, and public attention on the need for safety measures, culminated in this year's record appropriations for new air navigation facilities.

Later, Brewster's aviation subcommittee heard aircraft manufacturers present their case. The Maine Senator moved to have a board of congressional, government, and industry representatives established to thoroughly review the requirements of air transport and aircraft manufacturing. In the House, Hinshaw pushed to give Air Coordinating Committee statutory authority to do the job. The President, pricked by the Brewster and Hinshaw moves, set up his own Air Policy Commission.

A Congressional Aviation Policy Board was then organized, with Brewster as chairman and Hinshaw as vice chairman. General recognition of the Air Force this year as the country's new "first line of defense" was an outgrowth of the findings of the Commission and Board.

• PURCHASING POWER...



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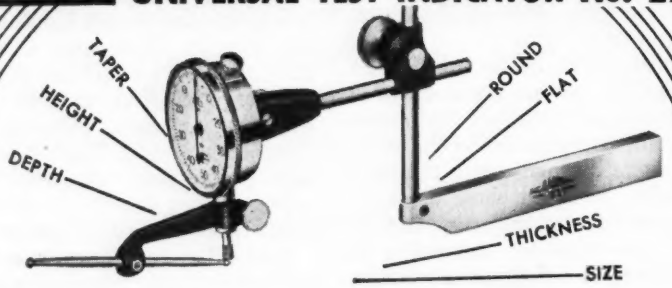

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AVIATION CALENDAR

Oct. 6-8—National Association of State Aviation Officials, Copley Plaza, Boston.
Oct. 6-9—Society of Automotive Engineers aeronautic meeting, Biltmore Hotel, Los Angeles.
Oct. 9-24—Texas State Fair Aviation Show, Dallas.
Oct. 10—Air Fair, at San Francisco Municipal Airport.
Oct. 14—Annual Air Line Dispatchers Association convention, Edgewater Beach Hotel, Chicago, Ill.
Oct. 14-16—Air Reserve Association, annual meeting, Orlando, Fla.
Oct. 15—Annual Fall Regatta, Philadelphia Aviation Country Club, Wings Field, Ambler, Pa.
Oct. 15-24—International aircraft exhibit, Royal Danish Aeronautical Society, Copenhagen.
Oct. 17—Air Age Exhibition, Lambert-St. Louis Municipal Airport, sponsored by Metropolitan St. Louis Aviation Council and the City of St. Louis.
Oct. 17-21—National Aviation Clinic, Detroit.
Oct. 18—AIA personal aircraft council, Detroit.
Oct. 18-23—American Society of Travel Agents, Savannah, Ga.
Oct. 20-21—National Safety Council, Air Transport Section, Hotel Stevens, Chicago.
Oct. 21-22—Society of Automotive Engineers production meeting, Statler Hotel, Cleveland.
Oct. 22-23—4th Annual Arizona Aviation Conference, sponsored by Chamber of Commerce, Prescott.
Oct. 22-24—Idaho Flying Farmers convention, Lewiston, Idaho.
Oct. 25-26—Third Annual Indiana Aviation Conference, Purdue University, Lafayette, Ind.
Oct. 28—Society of Automotive Engineers, metropolitan section transportation and maintenance meeting, Engineering Societies Bldg., New York City.
Nov. 4-5—Society of Automotive Engineers, fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla.
Nov. 7-13—Flight Safety Foundation aircraft accident investigation course, Woods Hole, Mass.
Nov. 13-16—American Society for Testing Materials, petroleum products and lubricants, Drake Hotel, Chicago.
Nov. 15-17—Aviation Distributors and Manufacturers Assn., sixth annual meeting, Hotel Statler, Cleveland.
Nov. 15-17—National Aviation Trades Assn., annual meeting, Allerton Hotel, Cleveland.
Nov. 16-17—American Society for Testing Materials, plastics, Atlantic City, N. J.
Nov. 16-18—National Association of Travel Officials, Miami Beach.
Nov. 17-19—American Society for Testing Materials, electrical insulating materials, New York.
Nov. 18-19—American Society for Testing Materials, structural sandwich materials, Philadelphia.
Nov. 23—ICAO southeast Asia regional air-navigation meeting, New Delhi.
Dec. 2-5—Fourth annual international aviation celebration, El Paso.
Dec. 17—Annual Wright Brothers Lecture, Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Bldg., Washington, D. C.
Jan. 5—Florida Flying Alligator Club, 14th annual reunion, Melbourne, Fla.
Jan. 10-14, 1949—Society of Automotive Engineers, Annual Meeting and Engineering Display, Hotel Book-Cadillac, Detroit, Mich.
Jan. 27—Society of Automotive Engineers, metropolitan section, fuels and lubricants meeting, Engineering Societies Bldg., New York City.

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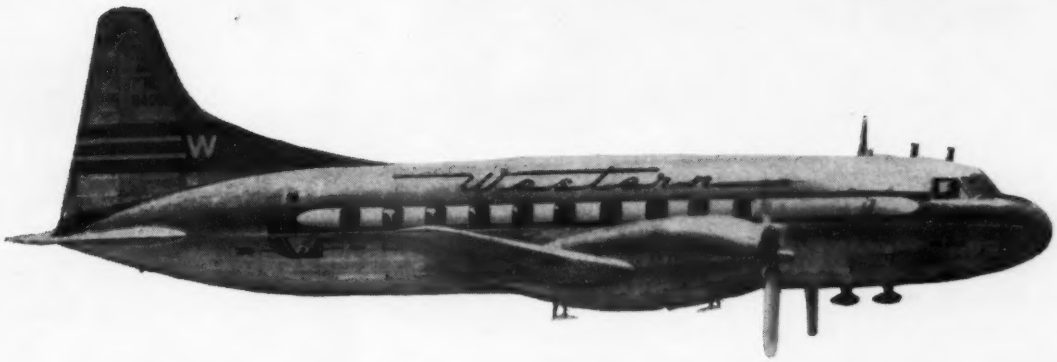
Western Air Leads Again

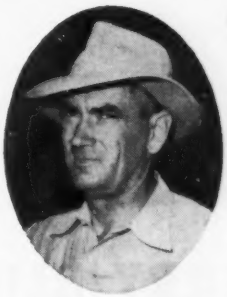


WITH A FLEET OF CONVAIR '49ers

TONY FAVERO

Superintendent of Service and Overhaul for Western Air Lines says, "VCC X-69 best aircraft surface brightener by production test."

A symphony in silver as it streaks across the sky, is the time saving—economical Convair '49er—the greatest achievement in air line travel. The magnificent appearance of Western Air Lines Convair '49er, as well as all craft operated by Western Air Lines, is due to a large degree to VICTOR BRAND'S VCC X-69, Aircraft Surface Brightener. VCC X-69 was selected by Western Air Lines after extensive competitive tests which proved this VICTOR BRAND product excelled all others in obtaining a brighter aircraft surface with fewer man hours. In fact, Western Air Lines found that VCC X-69 saved 50% of the man hours ordinarily required to polish aircraft.



MATT SWIFT

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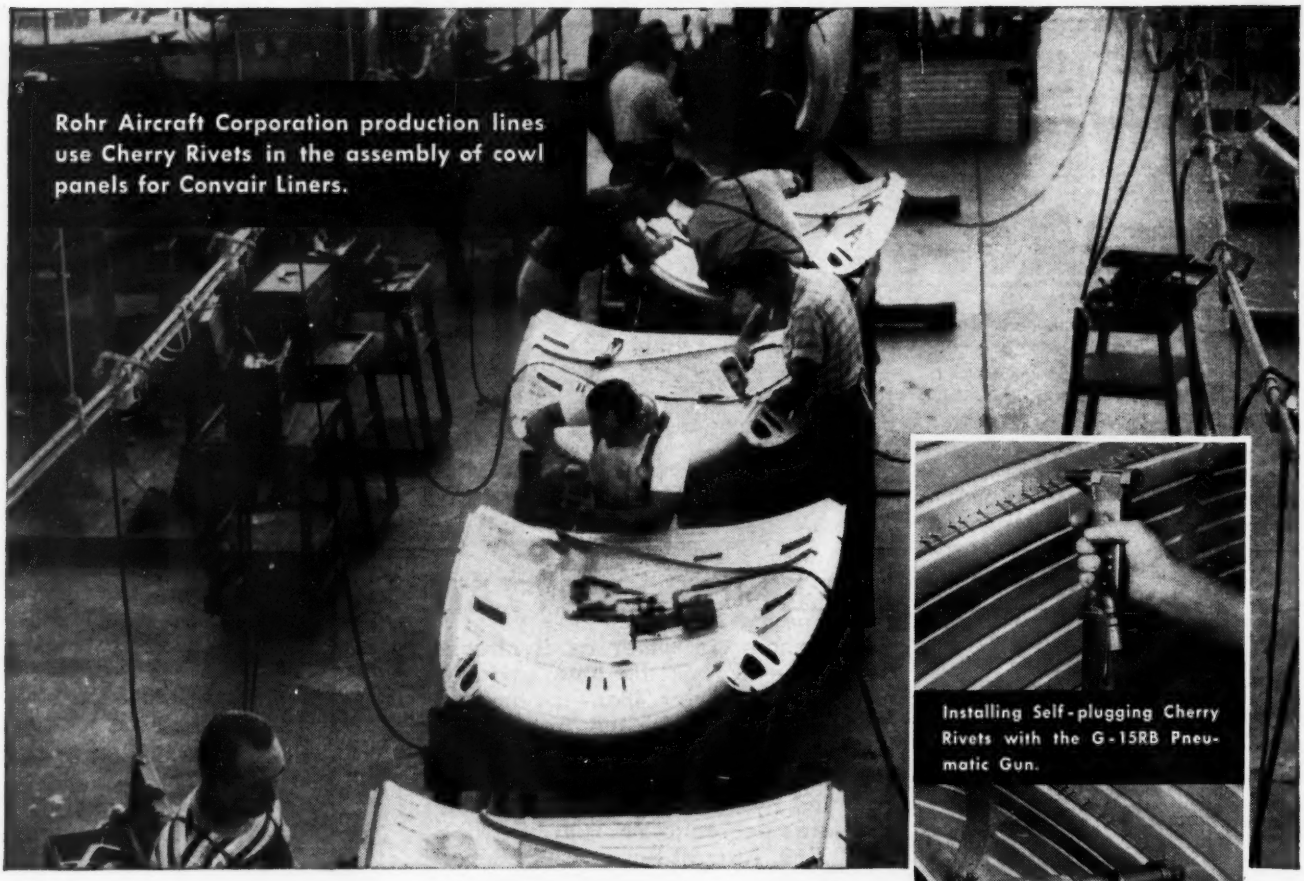
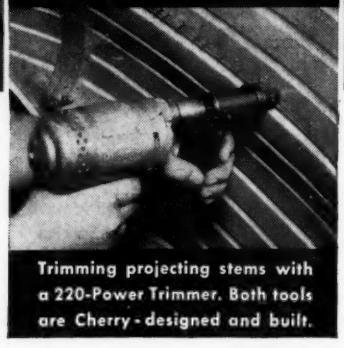


Rohr Aircraft Corporation production lines use Cherry Rivets in the assembly of cowl panels for Convair Liners.

Installing Self-plugging Cherry Rivets with the G-15RB Pneumatic Gun.



Trimming projecting stems with a 220-Power Trimmer. Both tools are Cherry-designed and built.

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NEWS DIGEST

DOMESTIC

Air Force and Republic Aviation jointly grounded F-84 fighters pending investigation of two recent accidents, both in connection with Air Force Day celebrations, at Dallas and San Bernardino, Calif. Some 400 Thunderjets are affected.

Charles Dycer, CAA director of aircraft service, will retire to be replaced by George Haldeman, formerly of CAA sixth region. Dycer's retirement follows several months of illness. Haldeman has specialized in new aircraft type certification and has performed most of these tests as pilot. He has been flying since 1919 and once attempted a trans-Atlantic flight with Ruth Elder.

Presidential certificate of merit was awarded Loren F. Jones for his development of Teleran, a radar and television air navigation system, and Hugh H. Spencer for his wartime work as chief, guided missiles division of OSRD. Both scientists are now employed by Radio Corporation of America.

General Hoyt Sanford Vandenberg has called all Air Force commanders to a conference at Maxwell Air Force Base, Ala. this week.

FINANCIAL

Glenn L. Martin Co. received an additional $3 million loan from the Reconstruction Finance Corp. for working capital. Martin originally borrowed $26,775,000 from RFC more than a year ago and has repaid $15,975,000.

Continental Motors Corp. for nine months ending July 31, reports profit of $2,536,129 after taxes on sales of $85,592,860.

FOREIGN

Bolivian Air Force has started regular public transport service within Bolivia. Bolivian ministry of defense has authorized the air transport squadron of the BAF to carry passengers, mail and cargo to any and all airports in Bolivia and without payments to air lines which administer these airports and services.

British South American Airways has returned all of the AVRO Tudor IV transports to the London-Bermuda-Nassau-Kingston route. The planes have not been in service since January, 1948 when the Star Tiger disappeared. The service operates every Thursday via Keflavik, Gander, Bermuda, Nassau and Kingston and return to London on Saturday.

INDUSTRY OBSERVER

► Convair has completed engineering and begun construction of changed parts for the B-36C powered by an advanced model of the Pratt & Whitney R-4360 Wasp Major engine. A feature of the new engine is reduced fuel consumption, giving the new bomber an even greater range. The B-36C is scheduled for completion this fall at which time the Air Force projects an attempt at the world's nonstop distance record. Calculations give the new model a range of 12,000 miles, a safe margin over the 11,236 mi. record of the Navy's Lockheed P2V "Truculent Turtle."

► British now are test-flying the most powerful turbojet engine to take the air. Rolls-Royce's new axial flow turbojet, the Avon, is rated at 7500 lb. static thrust. Two Avons now are flying, installed in the outboard nacelles of a Merlin-powered Lancastrian.

► Vickers has an order for a sizable quantity of Supermarine Attackers from the British Navy. The Naval version of this 600 mph. jet fighter will feature folding wings and be known as the Seafang.

► Grumman will begin production of its Panther (F9F) next month with the jet fighters scheduled to be rolling off the line at a 30 per month rate by next July. Recent performance of Panther prototypes in flight tests by Naval pilots has been somewhat below initial indications by company pilots.

► Gloster is working on a sweptwing replacement for its twin-jet Meteor fighter. Gloster now has built more than 500 Nene-powered Meteors for the Royal Air Force. An experimental Meteor is now flying with two Metrovick F2/4 axial flow jets to test an underslung nacelle installation on the wings.

► Douglas Aircraft Co. has a Navy contract for two experimental prototypes of the XA2D-1, a multi-engine carrier based attack bomber. The XA2D-1 will advance the Navy trend toward larger, multi-engine carrier bombers begun by the North American AJ-1 (55,000 lb.). North American is also working on design of the A2J-1, an even larger carrier bomber. Douglas' new pusher type USAF trainer will be known as the T-30.

► New record for the working altitude of helicopters may have been established when Bell 47-Ds performed successful tests for the U. S. Geological Survey and U. S. Forest Service at density altitudes of 10,200 ft. (Salina, Colo.) and 9000 ft. (Big Bear Lake, Calif.). In both tests the helicopters delivered a man and equipment under routine working conditions. The Big Bear test delivered a fireman and 30 lb. of tools to a simulated forest fire. The helicopter carried fuel for 100 miles.

► Northrop Aeronautical Institute has begun the testing of the Curtis L. Davis venturi-type aircraft engine silencer, and may offer the inventor shop space for commercial production. Institute reports have been prepared on performance of various small airplane engines fitted with the Davis silencer and the designer now is developing a unit for the 450 hp. Pratt & Whitney engine of a BT-13 trainer.

► Radioplane Corp., Van Nuys, Calif., is showing activity comparable to that of the closing phase of the war, especially in new-type target plane research. Radio-controlled models range from propeller-driven to those powered by pulse jet engines. Studies of baby turbojet and liquid fuel rocket designs imply a military interest in a supersonic target plane to train Navy gunners in surface defense against enemy supersonic fighters and bombers.

► A. V. Roe's four jet airliner the Tudor VIII averaged 315 mph. during its initial 20 minute flight test in England. This experimental transport is powered by four Rolls Royce Nene engines housed in two nacelles. Avro also is working on a twin-jet transport designed to carry 30 passengers.

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AVIATION WEEK

Oct. 4, 1948

Convair Forms Plane-Leasing Subsidiary

Plan aimed at airline market may cover aircraft produced by other manufacturers.

By William Kroger

Floyd B. Odlum's latest action to make Consolidated Vultee Aircraft Corp.'s Convair-Liner project pay off—formation of a subsidiary corporation to lease the planes to airlines—may cover a far greater field than any one plane or any one manufacturer.

If the original Convair-Liner leasing proposal is successful, the subsidiary corporation is almost sure to go into several other equipment deals that will be a radical departure from existing manufacturing-airline relationships.

Immediate goal of the Convair Equipment Corp., as the subsidiary now is known, is to purchase from the manufacturer 100 Convair-Liners and lease them to airlines with an option to buy. This would go a long way toward turning the Liner project from red to black, and would enable some airlines to acquire planes that they do not have capital to purchase outright.

▶ **Future Plans**—But that would be only a start for the new company. If the initial reception is favorable, Odlum associates see these developments as possible:

- The Equipment Corp. would maintain the spare parts inventory and do major overhauls on leased planes—leaving to the airline only operational worries.
- The corporation would buy new planes of any manufacturer and lease them to interested airlines.
- The corporation would finance sales of new transport planes, either through equipment trusts or other arrangements.

In short, the Convair subsidiary would go into activities never before probed by an aircraft manufacturer. Nothing of the scope of the new enterprise has ever been publicly proposed by a single private interest. Previous plans generally have envisioned a government corporation as the owning and lending agency, and several attempts have been made to obtain manufacturers' approval of a jointly-owned leasing company.

▶ **Terms**—Officials of Convair and Atlas Corp., the controlling stockholders in Consolidated Vultee, last week were busy in New York ironing out details of the leasing plan. They said definite arrangements may be announced within 30 days. To date, several proposals have been discussed.

West Coast sources report that one early arrangement, based on a price of $340,000 per airplane (which since has been increased), called for a flat rental of $9800 per plane per month, plus a utilization fee based upon actual flight hours per month. The Equipment Corp. would guarantee to hold one additional transport in reserve for each ten planes rented by a carrier. This would enable the renters to lease planes for short periods to handle abnormal traffic loads or other emergencies.

While it could be expected that these terms might be revised upward in view of the increased cost of the Convair-Liner, this is not necessarily so. By dealing in blocks of 100 planes and standardizing interiors, fittings and accessories, the manufacturer could keep production costs down. Moreover, the $9800 fee, irrespective of utilization charge, is regarded by informed observers as already so high as to imperil success of the plan.

Floyd B. Odlum

Based on that fee, a plane would cost the user at least $117,000 a year. In contrast, an airline that bought a Convair-Liner at an estimated cost of $400,000 and amortized it over the usual five-year period, would charge off only $80,000 a year for the plane. It might be, however, that the spare parts and overhaul arrangements would offset that differential.

▶ **Prospects**—Airlines mentioned as possible prospects to lease planes from the new corporation include Capital (which confirms that it has been approached), United, Mid-Continent, Braniff, Colonial and Eastern. Opinion of New York financial circles is that debenture holders of Capital would not permit it to go heavily into an equipment-leasing deal, and Capt. Eddie Rickenbacker, president and general manager of Eastern, recently turned down the purchase of Convair-Liners in favor of more Constellations.

Atlas officials state that the number of planes contemplated, 100, is the result more of production factors than of market surveys of probable customers. While the leasing arrangement might find favor also in the export market, this was not a serious consideration in the decision to organize the new corporation.

How large the field is for the leasing corporation is problematical. Airlines have limited experience in leasing transports, although a number of DC-3s and DC-4s were rented from War Assets Administration shortly after the war and recently C-46s have been leased from the Air Force. By and large, no unfavorable results in leasing have been experienced by the carriers who have engaged in this practice.

In commenting on the Convair plan, several sources doubted that it could answer any real existing need. They declared that airlines with sound earning prospects could raise capital for equipment purchases (and an airline with risky earning prospects would do the leasing corporation little good), and that hard-pressed airlines need working capital right now more than they need funds for plane purchases.

▶ **Odlum the Key**—In the long run, however, the key to success or failure

of the leasing corporation may depend less upon the current capital position of the airlines than upon Floyd Odlum's determination to push the deal. In 25 years of administering to sick businesses (AVIATION WEEK, July 12), Floyd Odlum has a phenomenal record of success in his dealings.

The Convair Equipment Corp. is not a recent idea. Conferences leading toward specific rental plans have been under way since last February. One of the leading figures has been William C. Rockefeller, once associated with Alvin P. Adams, Los Angeles aviation consultant, and now executive assistant to Odlum at Convair.

At presently envisioned, the Equipment Corp. would be capitalized at $50 million, that figure representing in part working capital and not the purchase price of 100 Convair-Liners. Convair officials have talked informally with the Reconstruction Finance Corp. regarding an RFC loan—one report putting the amount asked of RFC at about $41 million.

Convair spokesmen said that the future of the corporation did not depend entirely upon RFC approval of a loan. They indicated Odlum will go ahead with private capital if RFC does not participate. This capital obviously could not come from deficit-ridden Convair which already has lost about $30 million on its present schedule of producing 158 Convair-Liners that have been ordered.

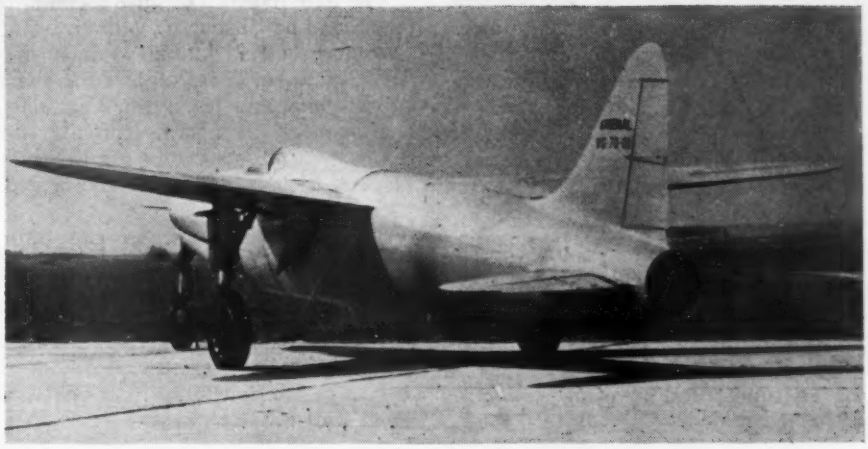
But behind Convair (and Odlum) stand the multi-million dollar Atlas Corp. investment trust and Odlum's long record of successful financial operations. He is not expected to have difficulty obtaining the capital.

Wright Men Receive Award At SAE Aeronautic Meet

Society of Automotive Engineers will award its 1947 Manly Memorial Medal to Erold F. Pierce and Harvey W. Welsh at SAE's National Aeronautic Meeting Oct. 6-9, Biltmore Hotel, Los Angeles.

Both recipients are with the Wright Aeronautical Corp., Wood-Ridge, N. J. Award was based on their paper, "Engine Compounding for Power and Efficiency," which reported theoretical studies of the problem of recovering power from airplane engine exhausts gases and showed up to 20 percent power gain in practical application of that theory.

This is the third time Wright Aeronautical Corp. employes have won the award, which was established in 1928 by SAE to honor the late Charles M. Manly, a pioneer in aircraft engine design.



FRENCH RESEARCH AIRPLANE

Arsenal VG-70-01, jet propelled French high-speed piloted research airplane, is shown preparatory to flight tests. Slim, light-weight monoplane is powered by German Junkers Jumo OO4B-2 turbojet engine rated at 1890 lb. thrust. This low power robs the swept-wing plane of performance its configuration makes possible and top speed is only about 550 mph. It has 28 ft. span, is 31 ft. long and weighs 6600 lb. Wing has upper and lower surface spoilers plus leading edge slots to accommodate 100 mph. landing speed. It carries 185 gal. of fuel, and has one half hour endurance.

Board Forcing NAL Showdown

Strike-crippled National Airlines is facing possible dismemberment by the Civil Aeronautics Board.

In an unprecedented move, CAB last week instituted an investigation to determine whether it is in the public interest for Pan American Airways to acquire National's New York-Miami route; for Delta Air Lines to acquire NAL's New Orleans-Jacksonville and New Orleans-Miami links; for Eastern or Delta to acquire the Miami-Havana, Cuba, run; and for "an appropriate carrier" to operate National's Jacksonville-Miami segment. The board will hold a hearing on the proposal about Dec. 1.

▶ **Sound Policy Sought**—CAB indicated the development of a sound air transportation system might be furthered by transferring National's routes, equipment and property to other airlines "under just and reasonable terms and conditions." The Board said its probe is consistent with recommendations made early this year by the President's Air Policy Commission and the Congressional Air Policy Board.

Some observers saw in CAB's latest action another manifestation of the hard-boiled attitude which has been developing since the air transport industry's financial position began deteriorating late in 1946. One of the first indications of this trend was in March, 1947, when the Board decided to investigate whether it was in the public interest to suspend indefinitely Chicago & Southern Air Lines' authority to operate some of its links in the Caribbean area in view of the high subsidy required.

By May of last year, CAB was investigating five carriers—C&S, Capital, Colonial, Northeast and Western—to determine why they were depending increasingly on government mail pay, whether they had uneconomic route patterns, and whether operations not yet inaugurated should be postponed indefinitely. The same month the Board started its still pending investigation of whether operations over All American Aviation's pickup system should be suspended.

▶ **Legal Authority**—Only last month CAB refused to extend the life of one of the country's experimental feeder-lines. And soon afterwards, in its Caribbean area decision (AVIATION WEEK, Sept. 27) the Board took pains to make clear that it has the legal power to withdraw previously-granted operating authority.

CAB lacks power to force other carriers to buy National's routes or to force NAL to sell them. But through its mail pay powers and its right to suspend services, the Board presumably could create irresistible pressures.

National, whose union pilots have been on strike since Feb. 3, has been discussing merger possibilities with Delta Air Lines since last spring. Other carriers have shown marked interest in acquiring portions of NAL's system if they can be had at a reasonable price.

▶ **Stockholders' Meeting**—CAB's latest

investigation preceded by only two days a National Airlines stockholders' meeting scheduled for Miami last Thursday. Even before the Board's action fireworks were expected at the session in view of the heavy financial losses suffered by NAL this year.

During the first half of 1948, the carrier had a systemwide operating loss of $991,571 against a $70,216 operating profit in the same period last year. The deficits continued through the summer, and the company recently informed CAB that higher mail pay is urgently required if all necessary services are to be continued and if a financial crisis is to be avoided.

While National has resumed service on all its routes with non-union pilots, its traffic has fallen off badly. In July and August of this year the company's systemwide load factors were 31.9 and 32.1 percent, respectively, compared to 43.3 and 47.7 percent in the same months of 1947. During the first half of 1947 National handled 165,605 passengers against 66,556 in the same 1948 period.

AF General Likely To Succeed Echols

Next president of Aircraft Industries Association is likely to be, like his predecessor, an Air Force general.

General Joseph T. McNarney, commanding general, Air Materiel Command, Dayton, Ohio; Maj. Gen. E. M. (Pop) Powers, USAF assistant deputy chief of staff, materiel, Washington; and Maj. Gen. K. B. Wolfe, AMC's director of procurement and industrial planning, all have been mentioned as likely prospects.

▶ **Pride Considered**—Rear Admiral A. M. Pride, chief of the Navy Bureau of Aeronautics; J. J. (Cap) Krug, Secretary of the Interior, are others among a lengthening list of prospects which an AIA board of governors committee is studying diligently.

Maj. Gen. Oliver P. Echols, (USAF, ret.) who recently submitted his resignation as AIA president to the board at the East Coast division meeting in New York, probably will continue to serve until the Dec. 5 meeting of the complete governors' board in Los Angeles.

▶ **Echols to Northrop**—At that time he would like to turn the job over to his successor, picked in the interim. Then he will be able to give full time to his new duties as chairman of the board, Northrop Aviation, Inc., Hawthorne, Calif.

Job of sifting data about the prospects is a rather delicate one, since all the men mentioned and others on the list are now active in other top-bracket posts.

The AIA board's executive committee headed by Eugene E. Wilson, board chairman, and including William M. Allen, president of Boeing, for the West Coast group, and J. Carlton Ward, Jr., chairman of the board, Fairchild, for the East Coast, is combing the list, with General Echols acting in advisory capacity.

Three factors point to the probability of selection of another Air Force general to head AIA:

- The excellent record that General Echols has made since he took over the post in January, 1947.
- The inescapable fact that USAF is now and will be, in the foreseeable future, the aircraft industry's biggest customer, so that the AIA president should have ability and experience to coordinate industry development and production with USAF requirements.
- The fact that the wide gap between the top salaries of military officers and those of top civilian management of equal caliber makes the AIA president's salary more attractive to a retiring officer.

Cannier observers waited last week for indication of preference by the powerful West Coast companies before venturing any prediction of a specific name as the one most likely to succeed out of the list being studied.

It may be recalled that West Coast companies were principally responsible for General Echols' selection, and that they have been pleased with his record, additional indications that another Air Force general stands a good chance of taking the AIA president's chair.

General Echols had served as commanding general of Air Materiel Command from March 1942 to March 1943, and later became deputy Air Force chief of staff in charge of research and development. He had a long record of experience in Air Force materiel and procurement and engineering work before advancing to these posts.

Oliver P. Echols

PCA to Start Sky-Coach Service

Low-cost, non-luxury, "sky-coach" service is slated to make its debut on the nation's certificated domestic airways on Oct. 15.

Capital Airlines (PCA) has become the first scheduled domestic carrier to adopt the inexpensive mass transportation technique which has been developed extensively by nonscheduled operators during the postwar period. Late last month Pan American Airways placed sky-coaches on its run between New York and Puerto Rico.

▶ **Four Cents a Mile**—J. H. Carmichael, Capital president, said his company would offer the new daily service between New York, Pittsburgh and Chicago at 4-cents-a-mile, a 35 percent reduction from first class rail rates and regular air fares. New York-Chicago fare on the sky-coach will be $29.60, against $27.30 by rail coach and $44.10 by Pullman.

The 59-passenger DC-4s will leave westbound from New York and eastbound from Chicago at 1 a.m. Terminal-to-terminal elapsed time eastbound is 4 hr. 10 min. Rail travel time is 16 hr. 45 min.

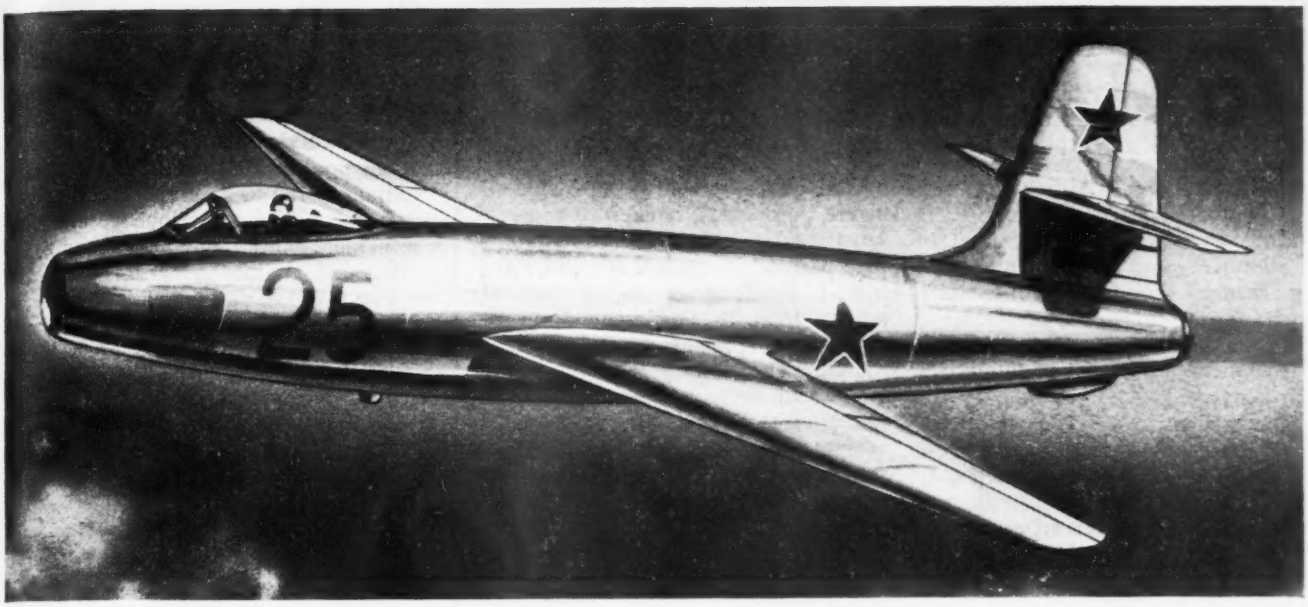
No meals will be served aboard the plane, and one stewardess or cabin attendant will be carried. Telephone reservations will not be accepted; the passenger being required to purchase his ticket at a Capital Airlines ticket office.

▶ **Opens Mass Travel**—Carmichael declared that the innovation in scheduled domestic air transportation is a development long awaited by the traveling public. He said the new service opens up a mass travel potential that is unattainable under present first-class rates. "The low-cost operation should react not only to the benefit of the public but to the industry as well in that more people will take to the airlines," the PCA executive explained.

Figuring importantly in Capital's decision to operate sky-coaches is the fact that the carrier has had a 16-hr. sales day. It has never moved much traffic between 11 p.m. and 7 a.m. Thus the new service should permit fuller utilization of both equipment and personnel.

▶ **Profit Possibilities**—Taking mail pay and cargo revenues into consideration, Capital believes it can make money with the sky-coach at a 50 percent load factor. Carmichael said that obviously if the experiment is successful on the high-traffic New York-Chicago link it may be extended to other portions of Capital's system—possibly on the New York-New Orleans route.

Dispatching the flights at 1 a.m. makes them virtually noncompetitive with trips operated by other airlines between New York and Chicago.



Russia's Fastest Service Plane

First details show new Yak fighter has speed of 630 to 660 mph.; in use with several squadrons.

First authentic details of a new Russian Yak jet fighter have trickled through the Iron Curtain.

The jet fighter shown above is the fastest Russian plane now in operational service with tactical squadrons. Its design was largely the work of Lt. Gen. Alexander Sergeiovich Yakelov, well known for his wartime fighter designs and for an earlier jet fighter, Yak 15 (AVIATION WEEK, Apr. 19).

▶**Drawing From Photo**—Drawing of Yakelov's latest model is the work of an experienced aviation artist and is based on greatly-enlarged motion picture film made with a telescopic lens. The film and technical details were secretly removed through the Iron Curtain.

The new Yak is the fighter referred to by U. S. Secretary for Air W. Stuart Symington last spring (AVIATION WEEK, May 17) when he told a Congressional committee that the Russians were building a "Chinese copy of the Republic F-84." However the new Yak bears only a superficial resemblance to the Republic F-84. Both feature a "straight-through" air flow and have a cigar-shaped fuselage.

▶**Tracked by Radar**—The new Yak is probably the plane reported some time ago over Korea by USAF radar experts who tracked a Russian jet fighter on their scope at better than 600 mph. The Yak has a speed range between 630 mph. and 660 mph. and is in service with several tactical fighter squadrons. This is in contrast to Russian versions of the German-designed DFS 346 (AVIATION WEEK, June 14) which, though faster, are merely experimental prototypes and not in high volume production.

From a time viewpoint the new Yak is comparable to the F-84 since it is the latest production jet fighter to go into operational service with the Red Air Force. The F-84 is the latest USAF jet fighter with which tactical units are equipped. Top speed of the current production model of the F-84 is just over 600 mph. Improved power plants scheduled for later model F-84s will boost this figure considerably.

▶**Switch in Flow**—The new Yak indicates the Soviet departure from the underslung jet installations in the belly evident in earlier jet fighters. The Russian developments of German designed axial-flow jet engines permitted a short tailpipe and relatively greater thrust.

Power for this Yak is believed to come from the British Rolls Royce Nene (5000 lb. static thrust). The centrifugal-flow Nene is the principal reason for the new Yak's fatter fuselage when contrasted with the lines of the F-84, housing an axial-flow J-35 turbojet.

News that the Russians were using British-designed engines in the Yak fighter caused considerable stir in British and American military circles last winter. Pressure was applied to the British Board of Trade to halt export of Nene and Derwent turbojet engines to Russia, but not until 60 of these engines had been delivered to Russia.

▶**Designed in 1945**—The new Yakelov design was begun in 1945 with the prototype flying early in 1947. This prototype was demonstrated at Tushino Airdrome near Moscow on Aug. 3, 1947, as a feature of Soviet Aviation Day. It has been in squadron service for at least six months.

The new Yak is of all-metal construction with a conventional type tricycle landing gear. Main wheels of the landing gear retract into the wings. Bubble type canopy offers excellent pilot visibility and slides back in one piece. The thin, straight wing design is obviously aimed at simplicity for mass production. Protrusion on the underside of the tail is a skid to protect the tailpipe during extreme nose-high landings. Armament details are not available.

Mass production of the Yak airframe appears to pose no unusual problems. Production of its British-designed jet engine is a more complicated matter.

NAC Plans Pamphlet Campaign to Orientate

National Air Council's extensive plans to make the public air-minded are awaiting approval by its board of governors, which meets this month.

Groundwork for distribution of leaflets and pamphlets is being done by John Dwight Sullivan, executive vice president of NAC, who has been meeting with national groups such as womens clubs, the Grange and labor organizations.

The NAC intends to follow the Finletter and Joint Congressional Board reports plumping for swift action on recommendations by both.

ECA Aviation Expenditures

The following table is a breakdown of total ECA dollars spent for aviation equipment, through and including Sept. 20. All were purchased in the U. S. unless otherwise specified.

Country	Airline	Kind or Equipment	Value
France	Air France	Engine, propellers, spare parts	$965,000
France	Civil air interests*	Spare parts	185,000
France	Civil air interests*	Ground handling equipment (from Bizone Germany)	30,000
France	Civil air interests*	Aviation electrical gear: radio altimeters, radio tubes, battery acid, pile voltage equipment, etc.	66,520
France	Civil air interests*	Spare parts for aircraft and ground radios	60,000
France	Civil air interests*	Parts & accessories	56,732
France	Air France	Parts and accessories	28,421
France	Civil air interests	Engines, spare parts and accessories	755,000
Denmark	SAS	Unpaid balance on 2 DC-6's	1,122,500
Denmark	SAS	Spare parts	100,000
Norway	SAS	Unpaid balance on 2 DC-6's	822,500
Greece	Civil airways	Spare parts	35,000
Netherlands	KLM	Unpaid balance on 7 DC-6's and spare parts.	5,000,000

* *Generally not Air France but rather smaller domestic airlines.*

ECA Increases Aviation Dollars

Most of $9.2 million authorized to date for planes and parts goes as reimbursement on earlier orders.

Dollars for aircraft, spare parts, and accessories now authorized by the Economic Cooperation Administration total $9.2 million. More aviation authorizations are appearing every week in ECA's procurement releases.

Don't expect Marshall Plan countries to be hounding your salesmen with orders, however—not yet at least. Roughly 85 percent of the total amount so far authorized has been in the form of reimbursements, where ECA takes over payments on purchases or orders that were made, in some cases, before ECA even started.

▶ **Finance Aid**—For example, the multi-million dollar grants to Norway and Denmark for SAS were for DC-6s delivered months earlier. The $5-million grant to the Netherlands for unpaid balance on seven DC-6s and spare parts for KLM are another such case. Total of $1.7 million for spare parts bought by Air France, however, represent new purchases.

• Prerequisite for ECA aircraft procurement authorizations is that either directly or indirectly the expenditure will increase dollar earning power of the country concerned. An example of this: ECA expects KLM and SAS to earn more dollars on their South American runs where the new four engine transports are to be used.

▶ **Low Priority**—Sellers of aviation equipment who hope for orders through ECA machinery should keep in mind that the importance of an aviation procurement authorization must be weighed against that of other commodities. Until food supplies, non-ferrous metals, cattle feed, etc., get caught up, ECA dollars for aviation equipment will continue at the present pace, at a low ½ percent of total ECA grants to date of $1,693,160,997.

Bulk of ECA's aviation authorizations have gone to foreign airlines (see accompanying table). In some cases domestic airlines of the participating countries have also benefited from the financial assistance.

Navy Buys Wright Compound Engines

Wright Aeronautical Corp. has been awarded a $32 million Navy contract for production of its two higher-powered versions of the R-3350 reciprocating engine, the 2700 hp. Cyclone 18 and the even more powerful Turbo-Cyclone 18 compound engine.

The Turbo-Cyclone, which was described in detail more than a year ago in AVIATION NEWS and was the subject of a progress report in AVIATION WEEK, Apr. 12, 1948, can develop up to 3240 hp., a 20 percent power increase taken through use of the exhaust to drive three turbines geared to the crankshaft.

▶ **Fuel Saving**—Instead of a power gain, the compounding can be utilized to provide a 20 percent range increase, or cut fuel consumption by 20 percent over the airplane's basic range.

As previously detailed, the Turbo-Cyclone combines the R-3350 engine with three "blow-down" type of velocity turbines turned by exhaust gases. Six stacks go to each turbine and it is estimated that the system recovers approximately 20 percent of the heat energy normally lost through the exhaust.

The turbines are so located as to add only a few inches to the overall dimensions of the engine. The compound engine thus can be installed in present airplanes and it fits within the cowl lines of existing installations with a minimum of change.

One of the first uses of the Turbo-Cyclone probably will be in the Douglas AD-3 Navy attack plane.

Master Tooling Dock Put Back to Work

As the aircraft industry tools up for its greatest peacetime expansion, a wartime development again has been put to use to speed the output of production equipment.

Nashville Corp., once a division of Consolidated Vultee, now a subsidiary of Avco Manufacturing Corp., said last week that it has returned to operation its master tooling dock. The 30-ft. facility produces masters, jigs and fixtures and, according to John M. Carpenter, technical director, is the finest instrument available to meet the exacting requirements of the aircraft industry.

Nashville Corp. is offering to subcontract its tooling facilities to prime contractors. In addition to the master tooling dock, these include the cerro-matric coupler for design of major tools; the geometric mastering system; and the collimator, which permits a jig component breakdown and later perfect assembly at the prime contractor's plant.

Parts Prospect

Standardization nearer as result of Air Force, Navy, industry talks.

By Alexander McSurely

New effective procedures for standardizing aircraft parts used by both Air Force and Navy are expected to emerge from a recently approved system for integration of viewpoints of Air Force, Navy Bureau of Aeronautics and the aircraft manufacturing industry.

First steps to implement a recent services-industry agreement which makes the new system possible were taken at a two-day Washington session of the National Aircraft Standards Council. The council is designated by the agreement as the agency charged with initiation of specific projects for standardization.

▶**Fastening Devices**—Standardization projects under the initial agreement will be confined to "utility parts, complementary materials and processes." This includes standard hardware items of the general type included in the A-N 1-1000 classification including the more widely used fastening devices such as bolts, screws, rivets, fittings and other fasteners.

The 15-member National Aircraft Standards Council includes seven industry members, headed by D. Roy Shoults, vice president engineering, Glenn L. Martin Co., who is chairman of the Aircraft Industries Association's aircraft technical committee. The other industry members: Walter Korff, Lockheed; Tom Salter, Cessna; Carl J. Hansen, North American; J. Perina, Republic Aviation; John F. Cramer, Boeing, and Marshall F. Allen, of the AIA technical services staff who is secretary both of the council and of the National Aircraft Standards Committee (an AIA technical committee, which provides the industry members for the council.)

▶**Names Awaited**—Appointments of the eight services representatives on the council had not yet been confirmed as this was written.

Divided authority and responsibility was found to be the principal stumbling block in effective standardization work theretofore. In some previous projects delays of as much as two years had been experienced while an original draft agreement was subjected to changes, minor and major, first by one party and then another. Sometimes there would be disagreement within a single service so that one representative's viewpoint would be countermanded later by his superior in the same service with resulting confusions and delays.

▶**Project Subcommittees**—Key to the new program is establishment of a special subcommittee for each standardization project. It will include: a representative of the Aeronautical Standards group; representatives of the military services and industry; and may call in additional interested parties or company representatives at the discretion of the council and the firm which is named project sponsor.

By having wide representation on each subcommittee, it is hoped by the planners of the program that viewpoints can be coordinated into a concrete proposal which in most cases should stand with little modification.

▶**Procedure Outlined**—When the subcommittee agrees on a proposal it is to be circulated concurrently to the military services and the aircraft manufacturing industry. Coordinating agencies for circulation are the Aeronautical Standards group for the services and the National Aircraft Standards Committee for industry.

A 30-day deadline for comments is another departure from previous practice. However, it is contemplated that each representative on the special project subcommittee will circulate the proposal to the service or industry he represents, and give it some personal expediting to make it possible to meet this deadline.

▶**Speed Process**—The services have agreed that while copies of proposals and other actions of the council will go through the customary routing from the commanding general or commanding admiral on down through channels, that the officers directly concerned will have originals sent directly to them to speed the process additionally.

The deadline clause provides that within 30 days after the proposal has been submitted by the subcommittee the project sponsor shall be notified of its approval or disapproval by the services and the industry. If approved, the standards will be released for printing and for use on military aircraft. If disapproved, the subcommittee will prepare a revised proposal and submit it for re-circularization.

▶**Efficiency Gain**—If major disagreements among the services on any standardization project can be resolved in preliminary stages before the final proposal is circulated, a considerable gain in efficiency may be anticipated. Planners of the new system feel that this can be accomplished if the subcommittee members are well chosen, and can accurately reflect the consensus of opinion from their respective services, after preliminary consultations and before the proposal is crystallized for final circulation.

▶**One-Year Pact**—The agreement extends for one year from the Aug. 16 date. For the purposes of the agreement, the aircraft manufacturing industry includes the airframe prime contractors and subcontractors and vendors whose products form an integral part of the airframe, but does not include engine and propeller manufacturers.

While no attempt is made to set up exclusive "spheres of interest" for the services and for industry, the agreement outlines primary interests of the military services and primary interests of the industry in standardizations as follows:

Military Services:

- To specify operating conditions and performance characteristics which end products must meet.
- To insure that parts and components requiring overhaul and replacement meet field maintenance requirements.
- To insure adequate inspection requirements.
- To assure adequate sources of supply of parts and components for replacement, overhaul and repair of end product.
- To specify supplementary material requirements in cases where it is not possible to insure stability of product by specifying details such as performance.
- To insure to maximum extent practicable that materials and procedures used will not result in production bottlenecks, especially in national emergency.

Aircraft Manufacturing Industry:

- To design, develop and manufacture volume and quality of end products required by military services in conformance with requirements as stated above.
- To select and utilize materials necessary for efficient production of end product.
- To determine and utilize processes necessary for efficient production of end product.
- To insure inspection requirements adequate to meet design manufacturing requirements of industry with respect to production and materials as noted above.
- To determine that adequate sources are maintained for sufficient supply of parts and components for efficient production of end products.
- To insure to maximum extent practicable that materials and procedures used will not result in production bottlenecks especially in national emergency.

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Pressure Recovery Ups Jet Output

New parameter aids inlet-air problems. Data show gains in thrust, fuel consumption, climb, and range.

By Robert McLarren

Although the vital importance of efficient air handling in attainment of maximum performance from a jet aircraft has been well-known[1], detailed analysis of the effect of variation in ram recovery pressure on performance has been lacking.

As a result, designers have been forced to use an assumed pressure recovery efficiency, based on scant available inlet and ducting data, in performance calculations with a new design.

After design of the ducting system, mockup tests are used to determine more closely the actual efficiency, which has proved, sometimes, to be at wide variance with the original assumption. Modifications to the existing ducting system are then made and the airplane produced with this improved, but still inefficient, inlet system.

► **Inlet-Air Problem**—While the design goal has always been a "high" value for pressure recovery, designers have not had previously an accurate assessment of the significance of even minor variations in this factor. This is because, until recently, no accurate parameter existed that was readily measurable, that had a maximum value of unity (providing an indication of the maximum possible value) and that remained essentially constant under wide variations of speed (subsonic), altitude, temperature, etc.

Air cannot be admitted to the compressor inlet of the turbojet engine at high speed because of its low pressure in this condition. For this reason, it must be slowed down as much as is practicable to convert the velocity energy into pressure energy, since the power output of the engine is a function of the pressure and temperature of the air at the compressor inlet.

It is this diffusion of inlet air without serious loss of pressure that constitutes one of the major engineering problems in the design of a new jet aircraft.

► **Parameter Developed**—A parameter that meets the requirements outlined above has been developed[2]: $(H_1-p_o)/(H_o-p_o)$, in which H_1 is the total pressure at the compressor inlet in lb. per sq. ft., H_o is the total pressure of the free-stream, p_o free-stream static pressure.

Maximum value of this parameter, which would occur when the total pressure inside the duct equalled that of the free-stream, cannot exceed a value of 1.0 and both total and static pressures are easily measured.

► **Thrust Data**—To establish the effects of ram-recovery ratio on turbojet engine performance, the standard Lockheed F-80 Shooting Star fighter[3] was selected.

This plane is powered by an Allison J-35 engine rated at 4000 lb. static thrust at 7700 rpm. An air consumption of 73 lb. per sec. and a specific fuel consumption of 1.08 lb. fuel per hr. per lb. thrust were used.

One of the first significant results of the study using this ram-recovery parameter and the F-80 data is shown in Fig. 1, which reveals the important effect of ram recovery on engine power at increasing speed.

At 550 mph. with the F-80 at sea level an improvement in ram recovery from its present 70 percent to only 90 percent would provide an additional 400 lb. thrust, or 10 percent of rated engine output through improved compressor inlet design.

Although this increase is minimized with altitude, falling to only 200 lb. at 20,000 ft. and to only 100 lb. at 40,000 ft., its effect is proportionally more important at these altitudes.

► **Consumption Factor**—Effect of ram recovery on specific fuel consumption is shown in Fig. 2. A consumption of 0.1 lb. fuel per hr. per lb. thrust can be saved at 550 mph. at sea level through a 20 percent improvement in ram recovery. Here, again, this improvement is minimized at high altitude, where the jet craft attains its best cruising condition.

This fuel saving is increased by higher flight speeds. A 20 percent ram recovery pressure increase would provide, at sea level, only a 2 percent fuel saving at 350 mph. but a saving of nearly 10 percent at 650 mph.

Whereas the net thrust increase created by this pressure recovery improvement is less than 5 percent at 350 mph. at sea level, it would increase to nearly 20 percent at 650 mph.

► **Effect on Climb**—Tactical importance of improved ram recovery pressure is

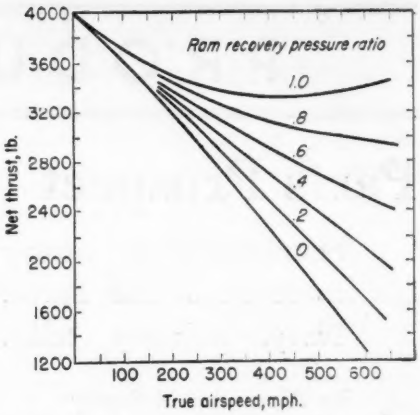


Fig. 1. Effect of ram recovery pressure ratio on net thrust of turbojet engine at sea level.

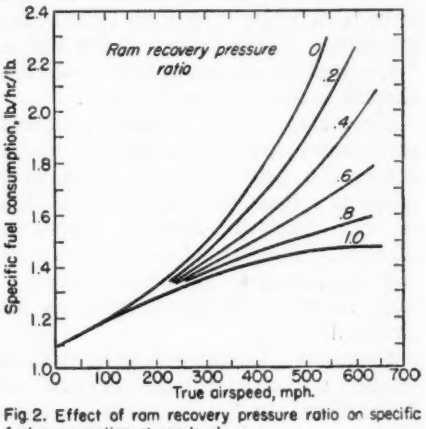


Fig. 2. Effect of ram recovery pressure ratio on specific fuel consumption at sea level.

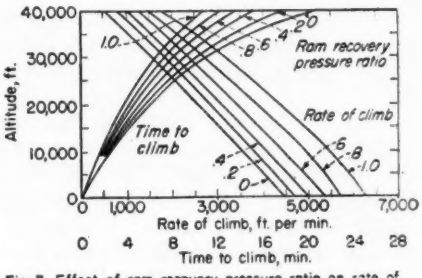


Fig. 3. Effect of ram recovery pressure ratio on rate of climb and time to climb for various altitudes.

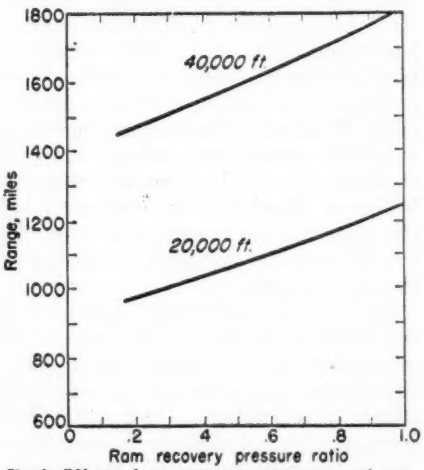
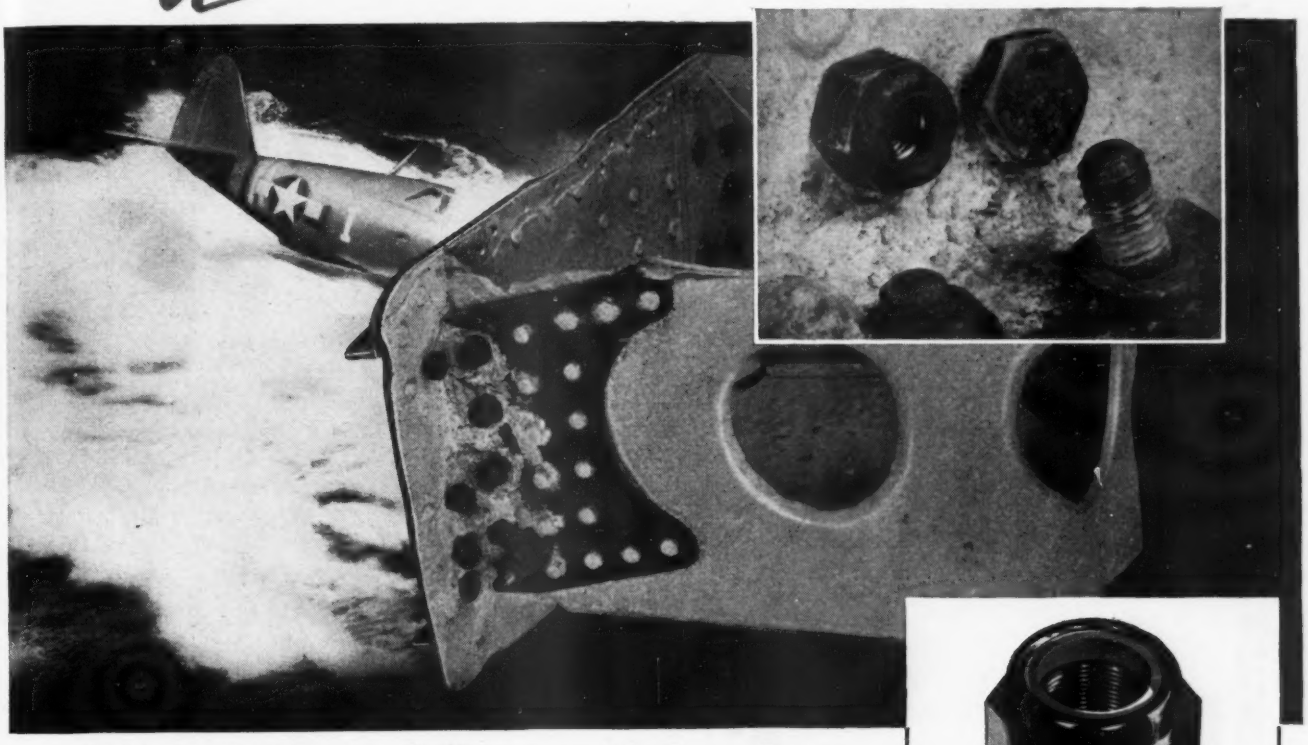


Fig. 4. Effect of ram recovery pressure ratio on jet fighter range.

2½ YEARS *Under the Sea* BUT THE THREADS ARE STILL CLEAN



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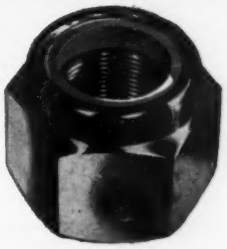

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seen in Fig. 3, which shows these effects on time-to-climb to various altitudes and the rate-of-climb at these altitudes.

Again, a 20 percent improvement in the inlet system of the airplane examined would permit it to reach 30,000 ft. bomber interception height nearly one full minute before its present capabilities would permit. At this altitude it would be climbing about 300 ft. per min. faster than at present.

► **Range Gain**—Perhaps of major tactical importance, however, is the gain in range available through improvement in ram recovery pressure. Fig. 4 indicates that the airplane examined could fly 100 mi. farther at 40,000 ft. with a 20 percent ram recovery pressure improvement than its present configuration would permit.

These data are indicative of the important gains in aircraft economy and performance available through improvements in ram recovery pressure. Many of these improvements have already been made and the McDonnell FH-1 Phantom is credited with a ram pressure recovery value of 99 percent under laboratory conditions, although much work remains to be done to attain this value in service.[4]

The axial-flow turbojet engine represents a distinct improvement over the earlier centrifugal flow design in this respect since it permits installations that are more simple and efficient in air inlet design.

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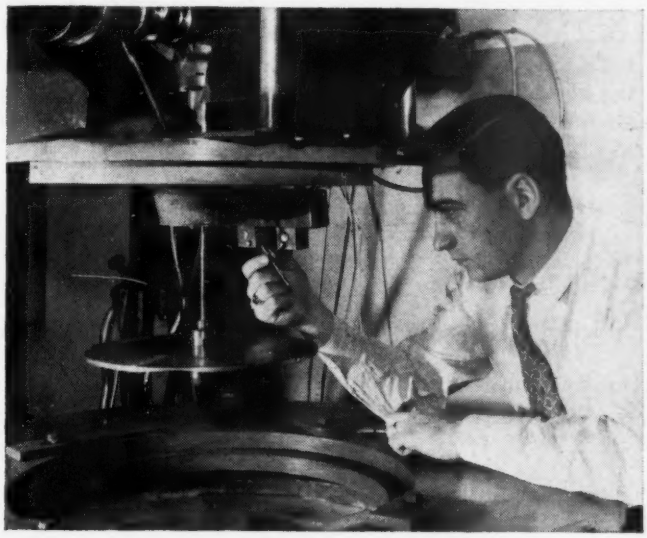
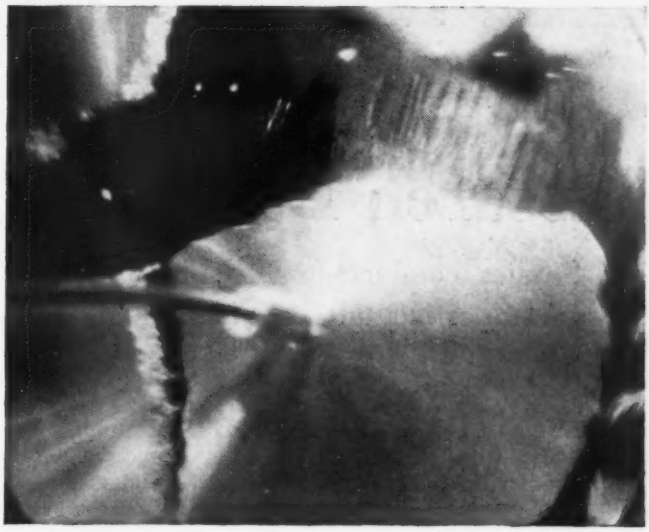


Closeup of spin pit shows simulated turbine wheel disk in place. The 8x10 camera is mounted on the pit's cover plate. Tiny mercury flash lamp (held by engineer) is coupled to 2000v. circuit for purpose of obtaining at one-five-millionths of a second . . .



. . . a photograph such as this, which shows a turbine test wheel as it bursts at 52,000 rpm. Drive shaft is bending, and turbine blades (lower right) can be seen as they break and make contact with the concentric copper screen liners, thus making the photo.

Test Turbines Near 100,000 Rpm.

Boeing constructs steel pits to study effects on blades of high speed and temperatures up to 1750 F.

Two spin pits, in which test turbine wheels for new jet development are whirled at close to 100,000 rpm. at temperatures as high as 1750 F., have been built at Boeing Airplane Co.'s propulsion laboratory in Seattle.

The pits, made up of layers of steel plate aggregating a 4½-in. thickness, are lined with 3½-in. maple blocks and can house 20-in. test wheels.

Power for tests is from compressed air driving a small turbine attached by a shaft to the test component.

A hoist, supported on a steel pylon behind each pit, supports the heavy cap plate, air turbine and accessories. Once the test piece is in place, the entire assembly is lowered into the pit and clamped, and the air evacuated.

Built-in heating coils of Nichrome steel wire are imbedded in clay holders and automatic controls maintain temperature at pre-set levels.

Using high-speed rotation and high temperatures to prove development before incorporation of parts in actual engines, tests are conducted on weldment of turbine blades, design of hubs and shaft holes, types of metals and design configurations.

Also checked are effects of weight and tensile strength of materials, rim loading, and profiles.

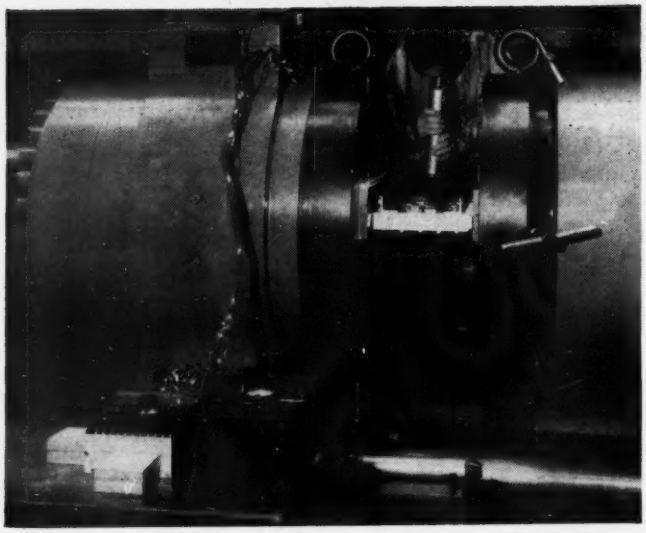
High speed photos, made with an ordinary 8×10 view camera, enable engineers to study test wheels at instant of breaking. A small mercury lamp is the light source.

The tripper consists of double concentric copper screens which line the test pit. At burst, the pieces of the test wheel crash into the screens, pushing them into contact and completing the flash circuit.

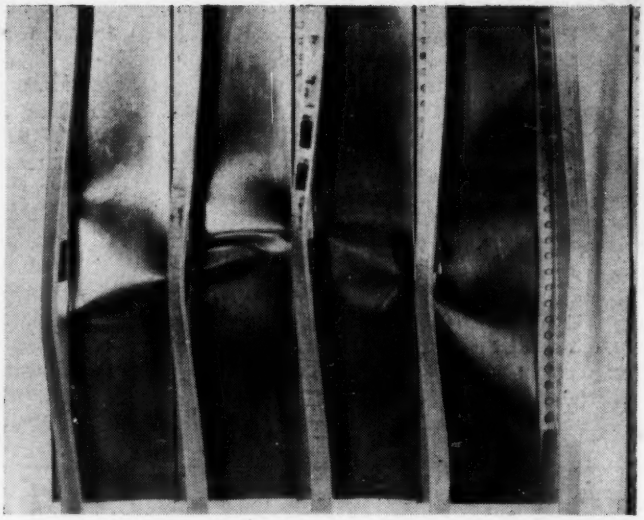
By this technique, any portion of the wheel which breaks loose serves to take its own picture.

An electronic rpm.-counter measures the speed of the wheel. One end of the spinning turbine shaft is divided into black and white sections and a photoelectric cell, focused on the shaft, sends a current impulse to the recording instruments each time the black portion passes its scanner. Timed and checked electrically, the speed is thus controlled within half of one percent accuracy.

Although most turbines in actual use generally reach maximum speeds of only about 35,000 rpm., Boeing has tested sample turbine wheels to 94,000 rpm.



Curved sheet-stringer panel in compression test, optical and wire strain gages measuring deformation. Tests showed effect of curvature on buckling and ultimate loads of semi-monocoque units.



Instability of stringers used to reinforce thin sheet is shown in this wing panel loaded to failure. Relatively thin stringers of open cross-section tend to buckle by combined twisting and bending.

Research Data on Sheet-Stringer Panels

Studies conducted at National Bureau of Standards for experimental confirmation of theoretical analyses.

Better understanding of the behavior of thin sheet in aircraft structures has resulted from tests and theoretical investigations conducted at the National Bureau of Standards for the Navy Bureau of Aeronautics and the National Advisory Committee for Aeronautics.

During flight, the airplane skin should satisfy two requirements—carry a large part of the load and remain aerodynamically smooth to prevent excessive drag.

Because of its flexibility, the sheet shows a tendency to deflect laterally and become wavy under load. Hence, determination of load at which transition from a smooth to a wavy, buckled condition occurs, and the effect of this buckling on the strength of the aircraft structure, are important problems.

▶ **Basis for Study**—A number of authors have considered, from a theoretical viewpoint, the buckling of sheet between stringers in a panel under end compression, strain distribution in the sheet as a function of stringer stress, and the load carried by the sheet.

However, experimental confirmation of this work has been meager and restricted in scope. Under carefully controlled end conditions, an experimental study has been carried out at the Bureau to investigate effects of stringer spacing, rivet or spotweld spacing, and sheet thickness on the load carried by the sheet for 24ST sheet-stringer panels in end compression.[1]

It was found that the effect of rivet spacing followed, largely, a theory proposed by W. Lavern Howland and that effect of stringer spacing could be determined from a theory derived by Karl Marguerre.

A nomogram—developed at the Bureau, on the basis of theory and experimental data—has made it possible to predict the load carried by a buckled sheet at failure.

▶ **Effect of Curvature**—In first tests, the panels were flat. To determine the effect of curvature, as in aircraft, additional tests covered a range from flat to 20-in. radius.[2]

This effect was shown to depend on the dimensionless ratio b^2/Rt, where b is stringer spacing, R radius of curvature, and t sheet thickness.

Curvature was found to increase markedly the load at which buckling occurred.

In one case with $b^2/Rt = 33$, the buckling load was increased 4.35 times. The load carried by the sheet at failure was, however, not appreciably affected by the curvature.

It was concluded that curvature would have a beneficial effect in delaying buckling, thereby keeping the skin of the airplane smooth to high loads, but that it could not be expected to increase appreciably the ultimate load.

▶ **Lateral Loading**—Outer skin of the aircraft must resist lateral pressure of the surrounding air as well as loads in its own plane, such as the end-compressive loads. Also, with seaplanes, the bottom plating must withstand severe impacts during landing and takeoff, especially in rough water. Under such conditions, pressures as high as 6 psi. have been measured, while theoretical considerations indicate that much higher pressures are possible.[3]

With high-altitude flying and pressurized cabins, differential pressures as high as 6 psi. are not unusual.

Hence, a series of tests was conducted to determine to what extent lateral pressure affects the ability of sheet-stringer panel construction to withstand the primary axial structural loads.[4]

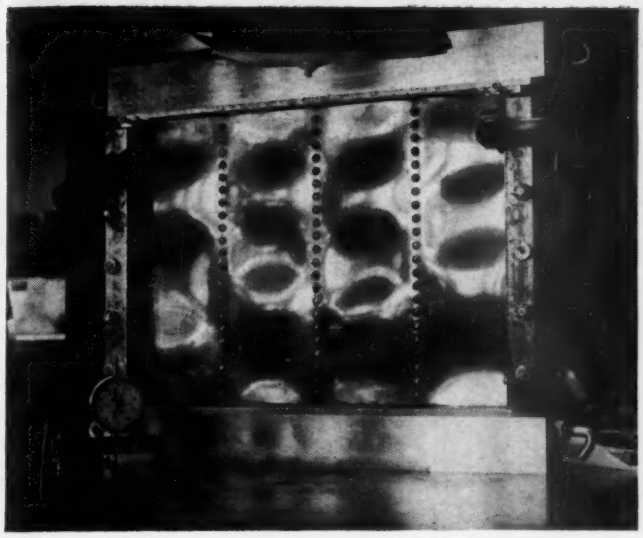
An elaborate technique was required to prevent the lateral loading devices from restraining axial shortening of the panel. An additional problem arose when laterally loaded panels tended to buckle with a "pop," disturbing the sensitive displacement-measuring gages.

Results indicate that the effect of normal pressure on the behavior of sheet is quite similar to that of curvature, and followed the dimensionless ratio pb^4/Et^4, where p is pressure, b stringer spacing, E Young's modulus, and t sheet thickness.

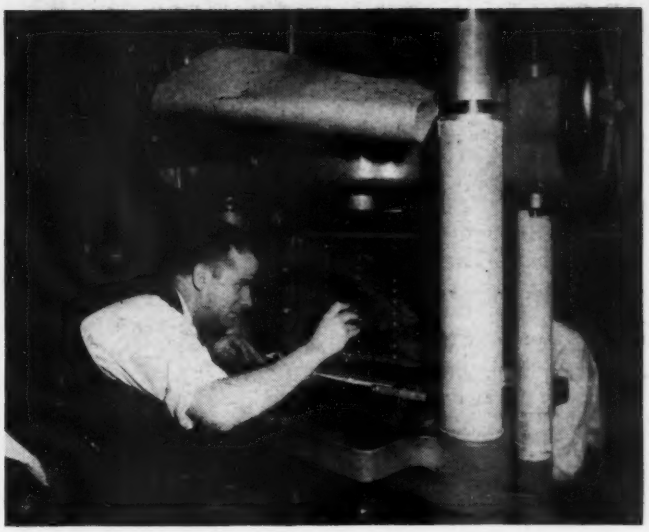
Even small pressures caused some increase in the buckling load, while for large pressures the increase was as much as 500 percent in some cases.

An interesting—and paradoxical—result was found in some of the tests with lateral pressure and axial load. In the presence of lateral pressure, doubling the sheet thickness brought a reduction in the buckling stress.

This was attributed to the condition that the thinner sheet "dishes in" farther under normal pressure and the stabilizing effect of the dishing more than compensates for the reduction in stability from reduced sheet thickness.



Subjected to compressive loads, sheet between stringers becomes unstable and buckles. Load at which buckling occurs was found to increase as ratio of stringer spacing to sheet thickness decreases.



Here, measurements are made of lateral deflections of sheet due to buckling under compressive loads. Panel edges and ends are supported to simulate, nearly as possible; condition in a wing.

Lateral pressure on sheet-stringer panels was found to have little effect on the load carried by the sheet at failure and to cause a small reduction in the load carried by the stringers.

▶**Sheet Stress Analysis**—Paralleling the experimental investigations of the sheet-stringer panels, an attempt was made to obtain a rational analysis for the stresses in sheet as loaded in aircraft structures.

This was complicated by the fact that deflections of the sheet may be comparable in magnitude with the sheet thickness. In such cases, Kirchoff's linear-plate theory may yield results that are considerably in error, and a more rigorous theory that takes account of deformations in the middle surface should be applied.

Fundamental non-linear, large-deflection equations for the more exact theory were derived by von Kármán years ago.

Using the test results as a guide in the choice of a suitable series expansion for the lateral deflection of the sheet, a solution of von Kármán's equations was obtained in terms of trigonometric series.

Numerical results were computed for the effect of axial load, lateral pressure, curvature, and shear on the stress distribution in the elastic range for a variety of rectangular plates typical of aircraft construction. Computed results were compared with experimental data wherever they were available and found to be in excellent agreement.

▶**Stringer Instability**—The tests were primarily directed toward a better understanding of the relationship between buckling of thin sheet and its ability to carry axial load.

Of equal importance is the instability of the stringers used to reinforce the thin sheet.

These reinforcements, if relatively thick (as in steel bridges or buildings) have instabilities of the Euler-column type in which only bending takes place. But when the reinforcements are relatively thin and of open cross-section—as is frequently the case in aircraft structures—the instability becomes more complicated and involves both torsion and bending.

A general theory for this type of instability of stringers, when not attached to sheet, was developed by Robert Kappus in 1937. To check this, tests were made on 125 column specimens of reinforcements typical of aircraft.[5]

When used together with formulas that take plastic yielding of the material into account, Kappus' theory gave good agreement with experimental results.[6]

Success of Kappus' theory in explaining the instability of stringers not attached to sheet also suggested its use for stringers attached to sheet, as in conventional sheet-stringer airplane construction. The theory was extended to take into account the restraint the sheet provides against warping and twisting of the stringer.

A set of panels using Z-section stringers was subjected to axial compression tests involving extensive measurements of the deformations of the stringers near the failing load.

The extended theory was compared with the experimental results obtained at the Bureau and at other laboratories. For relatively heavy stringers (ratio of stringer thickness to sheet thickness of two or more), this theory yielded reliable values of the maximum load.

For panels with relatively light stringers (ratio of stringer thickness to sheet thickness of one or less), computed loads agreed with experimental values in many cases but not in all. When agreement was lacking, the computed values were always high.

The high values are attributed to the fact that neither Kappus' theory nor the extended theory takes adequate account of the distortion of the stringer cross-section which has been observed in some panels with relatively light stringers.

A rational theory for the failure of stringers of this type is still not available.

▶**Open Sections vs Hats**—One reason for preferring open-section stringers to closed hat-sections has been that they can be attached with a single row of rivets. This reduces fabrication cost and affords easier inspection of the riveted structure.

Although closed-section stringers are more stable, it was possible to obtain open-section configurations with aluminum alloy of moderate strength, such as 24ST, that would be stable up to the yield strength of the material. With the advent of alloys such as 75ST, having much higher yield strength, the greater stability of closed-section hat stringers makes their use preferable.

The trend in airplane construction toward high-strength alloys has resulted in an increasing use of hat-type stringers for reinforcing the sheet and, in some cases, double-skin, sandwich-type construction with corrugations or spacers used to separate the two sheets.

Current investigations of sheet-stringer construction are being directed primarily toward the fundamental mechanism of failure of such panels.

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Prove Electronic Units In Miniaturization Plan

A two-year program in the reduction of size and weight of aircraft electrical and radio equipment by the Air Materiel Command has produced savings of as much as 50 percent without impairment in the capacity of the various units.

The increasing complexity of electronic equipment aboard combat aircraft, particularly radar units, made mandatory the drastic redesigning of these devices.

▶ **Efficiency Unimpaired**—In one large bomber, more than 4,000 lb. of electronic equipment of 17 different types are carried. By substantial reduction in the weight and size of the installations, more useful load and space are made available.

Such units as capacitors, resistors, transformers, circuits, switches, vacuum tubes and wires have been reduced in size without loss in efficiency of operation. In some cases, the miniature devices have proved even more practical than the original standard-size equipment.

▶ **Other Basic Benefits**—In addition to the savings in weight and space gained by the miniaturization program, the new small-size, lightweight units are cheaper and more simple to manufacture, use less strategic material, occupy less storage space and are easier to transport and handle. And compared to bulkier equipment now in use, superior shock-resistant qualities have been demonstrated.

▶ **Difficulty Overcome**—Principal problem in the program was heat dissipation, since the smaller units create the same amount of heat as the larger units because they handle the same loads. This has been solved through the use of heat-resistant substances such as ceramic and glass insulation, Teflon-covered wire and silicone coatings and fabricating materials, which resist heat up to nearly 400 F., as compared with the 125 F. capacity of present units.

Helmet Design Aims At Wide Protection

Design of a 24-oz., improved pilot's helmet has resulted from headgear studies by Mr. Herman P. Roth and Dr. Charles F. Lombard at the University of California School of Medicine's Aero-Medical Laboratories.

The investigation—financed by contributions of six member companies of the Aircraft Industries Association—was undertaken because head injuries in aircraft crashes constitute about half of total injuries.

The helmet had to guard against skull fracture, brain concussion, penetrating wounds such as those inflicted by shrapnel, harmful vibratory forces, high temperature, and wind blast.

In addition, it had to be of minimum size and weight, be reasonably comfortable and sanitary, and present minimum interference with radio communication.

In accordance with these requirements, the researchers finally brought out a helmet with ½- to 1-in. spacing between the head and the shell, containing cellular cellulose acetate filler—a non-resilient, energy-absorbing lining. An inner layer of sponge rubber covered with chamois is for comfort.

Earphones are built into the helmet in special pockets. Ventilation holes are provided, and a sponge rubber bead runs around the helmet's edge.

Outer shell is comprised of four layers of laminated cloth.

First helmets were carefully hand-fitted via trial-and-error method. Later, an improved method of "dicing" the cellular material, mixing with a binder and packing into the shell was developed so that an individual fit would be possible at a reasonable cost.

Individual fitting is recommended for test pilots and others who desire maximum protection and comfort, but Aero-Medical Labs are now engaged in developing helmets that can be used by more than one person—possibly with a supplementary liner to provide adjustment for a limited range of head sizes and shapes.

Currently wearing the improved headgear are McDonnell Aircraft Corp. pilots in flight tests of the F2H-1.

Helmets for McDonnell and other major aircraft concerns are being made by working from plaster impressions sent in by the companies. Total time of fabrication extends from 60-80 days.

Now being made by Protective Equipment Co., Inglewood, Calif., the helmets cost approximately $225 each.

Insulating Material Resists High Heat

Two new thermal-barrier, sealing compounds have been developed to cover a wide range of aircraft use.

Designated Stabond FR-8 and FR-10, they are reported to cure by solvent release at approximately 80 F., forming a hard but not inflexible sheath. This may be given greater resistance to air and flame abrasion by incorporating additional support, such as perforated glass cloth or similar material.

The FR-8 compound is stated to resist temperatures up to 2000 F. The FR-10 material is reported to have properties similar to the 8 but having greater refractive power. Tests of FR-10 to 2800 F. for 15 min. are claimed to have given satisfactory results, with higher temperatures being withstood intermittently.

In another test attributed to a leading aircraft manufacturer, reports are that an oil tank covered with a ⅛-in. coating of FR-10 was subjected to a 2000-deg. flame blast for 36 min. without damage to the underlying metal. With a unprotected tank and the same flame, the metal burned through in ½ min.

The materials are stated to be particularly suitable as an insulating material for electrical junction boxes and heat exchanger couplings, as well as for sealing engine nacelles, and lagging hot air and exhaust ducts.

Applications in the fields of jet propulsion and guided missiles are under study.

The two compounds—marketed by American Latex Products Corp., Los Angeles—are made in various consistencies for application by trowel, brush or extrusion gun.

Cargo Power-Handled For Flight Unloading

A new cargo-dropping system, developed by Air Materiel Command engineers, will permit the unloading, while in flight, of 16,500 lb. of freight in just 5 sec. from a standard Fairchild C-82A.

An expansion of the basic system, designed for installation in the larger C-119B Packet, will handle 20,000 lb. in the same time.

The system has two basic parts: An overhead installation to carry supplies forward for dropping through a special hatch; and a floor installation for releasing heavier loads through the aft fuselage doors. Both arrangements are power-operated and are fully automatic.

▶**Overhead Monorail**—The overhead system consists of a monorail on which 15 roller assemblies ride. Each trolley supports a 300-lb. bundle, giving a total capacity of 4500 lb. of cargo. Set in motion, the endless chain on the monorail moves the trolleys forward to where each bundle is dropped through a 36×72-in. "paratainer" door in the fuselage floor.

▶**Floor Conveyor**—The floor system consists of three endless conveyor belt segments (9½ ft. long by 24 in. wide) on either side, six in all. Each segment is powered by an individual motor.

Segments on each side are aligned longitudinally to enable the cargo handling from one to the other rearward. Each segment can handle 2000 lb., so affording a 12,000-lb. capacity.

The entire assembly can be installed by two men in 30 min. Two additional conveyor lines can be added in the center to permit unloading of tanks, jeeps or other heavy cargo.

With the present C-82A, the rear doors must be removed for the unloading operation but the C-119B doors are so designed as to permit aerial delivery of heavy cargo with the doors opened against the airstream.

First C-119B Packet, of an Air Force order for 136, is scheduled for completion in December. Eight of the craft are scheduled for delivery to the Navy.

Fuel System Protection

A new corrosion inhibitor, RD-119, has been developed by Sinclair Refining Co.'s research department to add to the life of fuel system metal components.

This compound, added to the company's petroleum products during flow through pipelines to distribution points in the ratio of approximately 1 gal. to 16,000 gal. of fuel, is reported to provide a protective coating which insulates metal surfaces from deteriorating action of air and moisture.

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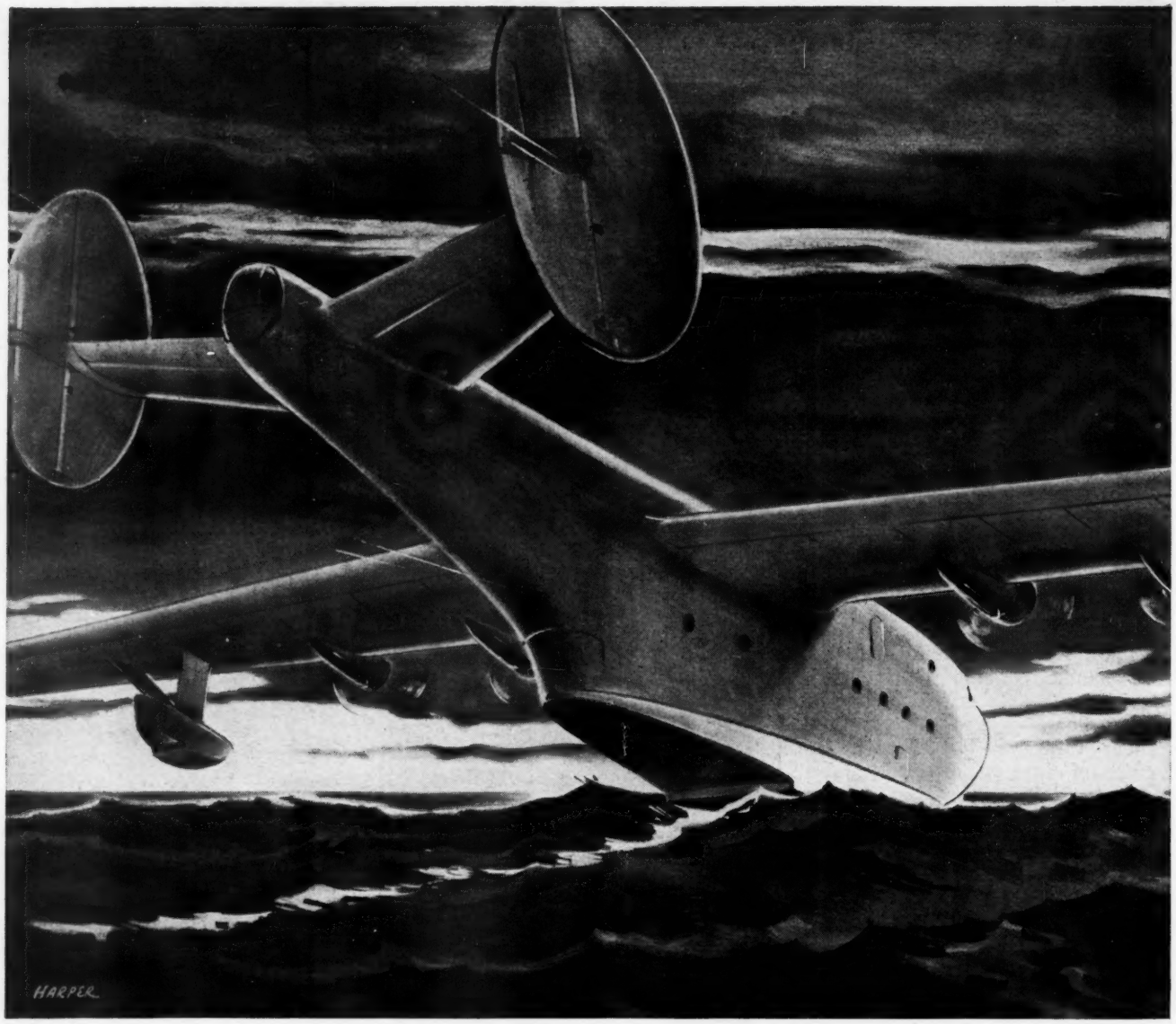

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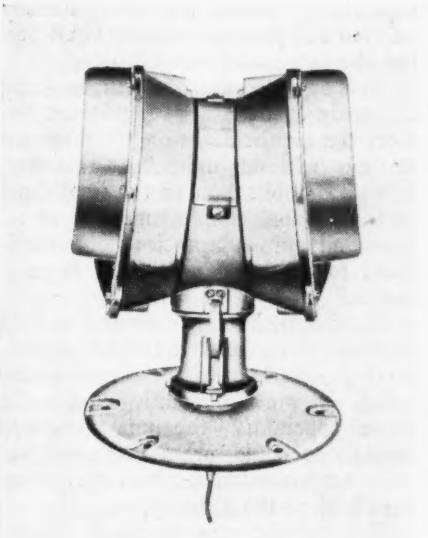
NEW AVIATION PRODUCTS



Lights Runways

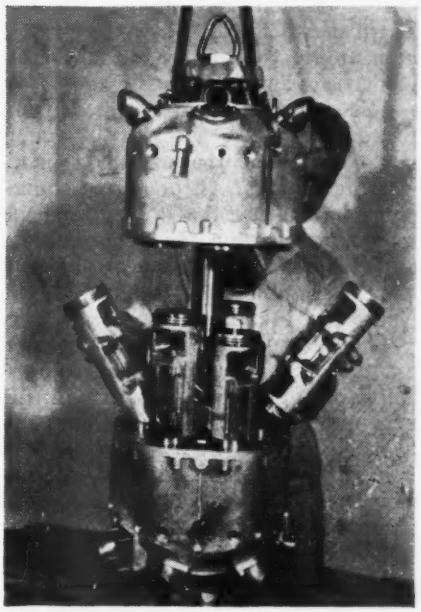
Bidirectional, high intensity runway light, type BHI, is announced by **Westinghouse Electric Corp.**, P. O. Box 868, Pittsburgh 30, Pa. Two main beams are formed by duplicate double-lens assemblies from single lamp. Color is provided by inner lens so no hot colored lens is exposed to rain or snow. Claim is that less than 10 percent of lamp lumens fails to fall on lens for redirection to useful zone. Unit uses 200w., 6.6-amp. aviation lamp no. 6.6. A/T 14P with medium prefocus base. Housing is one-piece, cast-silicon aluminum. Base plate is cast semi-steel. Top assembly lifts off for relamping and is indexed for one-way replacement.

Versatile Tool

For bolting up and nut running, reversible pneumatic impact wrench made by **Cleco Div., Reed Roller Bit Co.**, Box 2119, Houston, Tex., is also useful for reaming, tapping, stud setting and drilling. Tool contains no springs and is rated nominally for ⅜-in. bolts.

Crating Nut

Shippers by air will be interested in C6888 Speed Nut designed to keep heavy objects locked in crates without need for any supplementary vibration resisting parts. Made by **Tinnerman Products Inc.**, Cleveland 13, Ohio, nut tightens with wrench, to exert enough pressure on bolt threads to withstand jostling and vibration. Sizes are available for ¼-20 and ⁵⁄₁₆-18 carriage bolts.

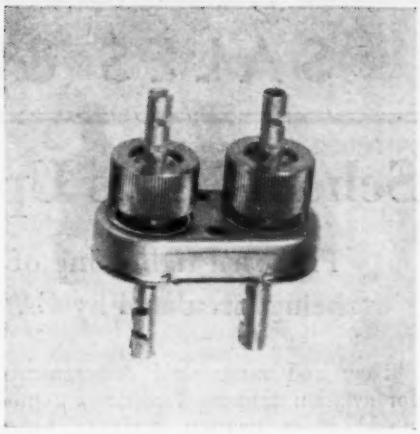


Cam Engine

Providing 12 power strokes per revolution, cam engine for aircraft is made by **Herrmann Engineering Co.**, 1405 Airway, Glendale 1, Calif. Shape of main cam produces harmonic motion of six double-ended pistons. Claim is that no reciprocal forces are passed on to other engine parts. Engine develops 170 to 190 hp. at 1800 rpm. It's stated that, supercharged, it has developed 225 to 270 hp. for 50 hr. without measurable wear. Weight with starter, generator and their gears is 286 lb.

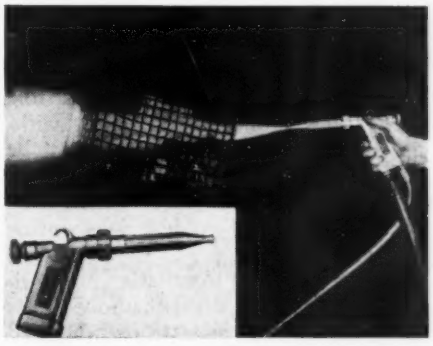
Data Plate

Claimed to cost 50-75 percent less than etched units, embossed aluminum identification plate made by **Chicago Car Seal Co.**, 634 N. Western Ave., Chicago 12, Ill., is stated to have exceptional legibility and ability to withstand rough usage. Device is available in wide range of letter and numeral sizes, and in tinplate, zinc, brass, stainless steel, and other metals.



Flameproof Connector

Firewall electrical connector is designed to meet CAA Safety Regulation Release No. 259 and be electrically and mechanically interchangeable with AN 5537 unit. Made by **The Winslow Co.**, 9 Liberty St., Newark 5, N. J., device has Steatite insulation and stainless steel jacket, bushings, jack heads and coupling nuts. In CAA compliance test, it's reported that flame was applied to connector on simulated firewall. Temperature was rated to 2000 F. for several minutes and allowed to rise to 2300 F. where it was held for 20 min., and at no time during this period was flame observed passing through the connector. After completion of test, connector was intact. Upon disassembly plating was found to have vaporized and beryllium copper detent springs had lost their temper, but otherwise connector was reported still serviceable.



Sprays Parts Clean

Designed to clean engines, landing gear and plane surfaces after application of proper solvents, Hydro-Air pressure washer is announced by **D & M Products, Inc.**, 4655 Kingswell Ave. Los Angeles 27, Calif. Using precisely controlled mixture of water and compressed air, device produces "cold steam" for penetrating and cleaning without back splash or harm to finish. Various adjustments enable quick removal of heavy dirt or grease and thorough rinsing of cleaning solvent.

School Rules Up for Revision

Proposed tightening of training facilities requirements being circulated by CAA for industry comment.

New and more rigid requirements for aviation training facilities are proposed in a revision draft of CAA Manual 50 which is being circulated to fixed base operators and other interested persons in the aviation industry for comments.

Besides "spelling out" requirements for the physical classroom, hangar and field facilities in much greater detail than in the present Manual 50 (as revised May 15, 1946) the new revision sets forth proposed requirements, for the first time, for glider and helicopter training schools, in addition to basic and advanced ground schools and flight schools giving primary, commercial, instrument and flight instructor courses.

► **Changes Old Manual**—The revision is also a sweeping change from the Manual 50 now in force in its general format, and should be much less susceptible to mis-interpretation in the field by reason of the change.

Study of the proposed requirements for ground school shows how much more detailed the new requirements are as compared to the present ones:

"The applicant must provide a classroom of permanent construction that will allow at least 30 sq. ft. of floor space per student scheduled for attendance at any one time. Lighting intensity must be sufficient to enable each student to read and study without eyestrain. Heating system must be sufficient to maintain a room temperature of 70 deg. or more during the normally expected coldest days during the winter.

► **Sanitary Code**—"Ventilation must allow air circulation without undue drafts upon the students or instructor. Housed within this building or within 50 yd. of the classroom must be toilet and washroom facilities that meet the local sanitary code. No classroom may be considered that will not accommodate at least a minimum of 20 students.

"All such buildings and classrooms shall conform to all local building codes. Each student must be provided with a desk-chair or a chair and desk suitable for study and writing. A blackboard so placed as to be visible by all students while at their desks and at least 4 by 6 ft. in size must be provided. The classrooms must continually be maintained in orderly, clean and renovated condition."

► **Detailed Interpretation**—All this detail is supplied by CAA to interpret CAR 50.10A **Ground School Requirements** which says "classrooms adequately heated and lighted, of sufficient size to accommodate the greatest number of students scheduled for attendance at any one time."

The proposed revision differs from the existing CAA Manual 50 ground school requirement principally by adding: the 30 sq. ft. floor space requirement per student; the 70 deg. temperature minimum, the absolute minimum of 20 students per classroom, the conformity to building codes and the blackboard minimum dimensions.

The ground-school proposed requirements are cited in such detail as an example of other details prescribed in the new proposed revision for buildings and flying fields.

A regulation-shy aviation industry which has long chafed under restrictive CAA red tape can be expected to question sharply the wisdom of putting such additional detailed restrictive requirements in the hands of CAA inspectors in the field.

NEW NAVION DISTRIBUTOR
Hugh A. Eudy, left, president, Carolina Aeronautics, newly appointed Ryan Navion distributor for North and South Carolina and eastern Tennessee, takes delivery of his first Navion at San Diego, from Earl D. Prudden, Ryan Aeronautical Co. vice president.

A prefacing statement to the revision draft states that: "In order to make these standards more equitable in all sections of the country we propose to allow reasonable latitude to the regional administrators of CAA in their application, provided safety, efficiency or supervisory control are not adversely affected and provided existing CAR permit the exercise of such latitude."

"It is expected that the great majority of airman agencies now certificated can meet the requirements of this proposed revision without difficulty. However, following publication of the final draft of this manual, ample time will be allowed all airman agencies now certificated to meet any additional requirements."

If sufficient leeway is allowed in field interpretations, and the CAA agents, as the one-time inspectors now are called, do work cooperatively with the school operators, the new proposed regulations could mean a general improvement in aviation school operations, beneficial to the industry.

However the new proposed requirements come at a time when the aviation training industry is overexpanded and hard hit by the drastic curtailment of GI flight training. With few exceptions the operators are in very bad financial condition, and can ill afford to make any physical improvements to their buildings or flying fields.

Reaction of most operators directly affected, may be expected to be in opposition to any new requirements which will cost any money, either directly for facility improvements or indirectly for additional reports.

If the proposed Manual 50 is adopted the result might well be that a considerable number of aviation schools now holding airman agency certificates might find it necessary to relinquish those certificates and operate substandard schools without CAA approval.

With the slashing of GI flight training through the indirect tactics of the Veterans Administration still going on in many sections of the country, CAA agency approval would not be such a necessary requirement for schools stripped of their GI flight contracts.

New England Map

An airport map of New England designed to provide a directory of airport and seaplane base facilities, conditions and services, for flyers in that general area has been published by Esso Standard Oil Co. Information shown includes airport elevations, length of longest runway, major highways, transportation to nearest town, field services offered, and grades of fuel. Copies are obtainable free at Esso Standard Oil Co., 15 W. 51st St., New York, or 378 Stuart St., Boston.

O'Connell NASAO Speaker

First major aviation speech of CAB Chairman Joseph J. O'Connell Jr. since he took office will be a principal feature of the National Association of State Aviation Officials annual convention at the Copley Plaza Hotel, Boston, Oct. 6, 7 and 8.

O'Connell will speak at the Oct. 7 noon session. Other speakers: Delos W. Rentzel, CAA administrator, Oct. 8 noon session; Senator Owen Brewster, (R., Me.) chairman of the Congressional Air Policy Board, Oct. 7 night session; S. Paul Johnston, executive director, Institute of the Aeronautical Sciences, Oct. 8 night session; Dr. Lynn Bollinger, Harvard University Business School, Oct. 6 night session; John F. Victory, NACA secretary; John Sherman, secretary of the Air Coordinating Committee; George Burgess, deputy CAA administrator, and Frank W. Wiley, Montana aeronautics director, all at Oct. 6 afternoon session.

Inspections of Massachusetts Institute of Technology Aeronautics Laboratory, the Raytheon Radar Laboratory at Bedford Airport, and the Aeronautical Research Foundation "quiet personal plane" are scheduled.

VA Report

Veterans Administration has reported the following figures on processing of applications for GI flight training during July and August:

► **July:** 617 applications approved, 52 rejected; 1551 referred to guidance and advisement division.

► **August:** 2427 applications approved; 144 rejected; 3772 referred to guidance and advisement.

The report bears out with official figures contentions of the principal aviation training and operations spokesmen, that the indirect VA method of disapproving applications by deferring them until the applicant drops out, through referring them to guidance and advisement officials, is the principal factor in the scuttling of the flight program.

CATA Merger

California Aviation Trades Association has completed plans for a merger of the California Dusters' Association into CATA as a special division. The organization of approximately 175 crop dusting operators, many of whom are already CATA members as individuals, is working on general problems of agricultural uses for airplanes, particularly spraying, dusting and seeding. National Aviation Trades Association is studying the California arrangement, with plans to make recommendations for similar divisions in other agricultural states.

BRIEFING FOR DEALERS & DISTRIBUTORS

EXECUTIVE AIRSTRIP—An approval certificate has been issued by Illinois Department of Aeronautics to R. G. Le Tourneau, Inc., at Peoria, Ill., for a restricted landing strip paralleling the east bank of the Illinois River, within the city limits and adjacent to the plant.

R. G. Le Tourneau, president of the company, which makes earth moving and highway machinery, has been one of the most active and continuous users of airplanes for executive travel, using large high-powered equipment. His personal plane is a converted Douglas A-26 twin-engine bomber. The company also uses a Lockheed Electra and Lockheed Lodestar for business travel. The strip is an asphalt runway 2895 ft. long and 100 ft. wide, and is marked by 16 marker lights.

Two other Peoria firms presented objections to certification of the strip at a hearing conducted by the department, but objections were overruled. Department regulations limit the use of the strip for company business flights under favorable conditions with lightly loaded aircraft, and as an emergency landing area for other aircraft. No commercial operation is permitted.

The Le Tourneau strip is the first to be approved within a metropolitan center as a private landing facility for an industrial firm in the state, and one of the first in the U. S.

CROSS COUNTRY TRAINING—A recent experimental cross country navigation training flight, made in a Cessna 170 from St. Francis, Kan., to Los Angeles and return, made it possible for three commercial pilot students of St. Francis Flying Service to log a considerable amount of dual time by alternating at the controls. Harry Resch, operator of the flying service, was fourth member of the party and supervised the flight. Westbound, the trip stopped at Amarillo, Albuquerque and Phoenix. Dead reckoning was used entirely except for radio for flight plans and position reports. Return flight was via Salt Lake City and Chevenne using low frequency radio ranges for navigation. Resch reported the 145 hp. powered Model 170 showed an average speed of 108 mph. with 6.7 gal./hr. fuel consumption.

GI ESSAY CONTEST—Bill Lazarus, Florida Aviation Supervisor, is preparing a memorandum for veterans interested in qualifying for flight training in approved flight schools under the GI bill of rights, as a guide in preparing applications "justifying" their need for the training. "It is a sad but true commentary," says Lazarus, "that a veteran must now win an essay contest before he can enroll in a course of his choice." At a recent Atlanta conference it was reported that Florida and South Carolina are now getting approvals on approximately one-third of all the veterans who apply for occupational flight training. Alabama and Tennessee had received no approvals whatever on any applications.

AERONCA ADOPTS STALL WARNING—Safe Flight stall warning indicators are being installed on all new Aeronca Aircraft Corp. models as standard equipment, including the four-place Sedan and the two-place Champion (tandem) and Chief (side-by-side) Planes. The Middletown, Ohio, manufacturer is the first in the low-priced personal plane field to make the equipment standard, although the indicator was already standard on the Convair-Liner and on a higher priced personal plane. Manufacturer obtained reports from a number of Aeronca owners who had voluntarily installed the stall warning devices on their planes, before making decision to standardize.

As a result of the installation, owners of Aeroncas with the indicators are entitled to a reduction in insurance rates. The indicator, mounted on the leading edge of the wing, employs a knife edge vane which actuates an electric circuit to flash a light and blow a horn in the cockpit when the plane approaches stalling condition.

VAN DUSEN ANALYSIS—Reports from flying sales representatives of Van Dusen Aircraft Supplies, Minneapolis, indicate increased total volume of sales of parts and supplies to airport operators this year over last, and a higher volume of business this year than last at many local airports. Good flying weather throughout the summer in the Midwest has brought increases to many operators over last year's business. New England, which lost revenue flight hours during the first six months due to heavy snows and subsequent bad spring weather, is finding summer flight activity "as busy as ever." —ALEXANDER McSURELY

FINANCIAL

NWA Pinched by 2-0-2 Grounding

Costs up and schedules down as aftermath of recent accident; carrier may update mail pay plea to CAB.

The battle for higher mail compensation may be intensified by Northwest Airlines as a result of the carrier's grounding of its fleet of 24 Martin 2-0-2s (AVIATION WEEK, Sept. 13).

While the carrier currently is using 19 DC-4s and 13 DC-3s, the previous schedule pattern has suffered with a present coverage of slightly more than 80 percent on the domestic routes. Furthermore, considerable flexibility in scheduling is lost with a limited number of aircraft available for operations. Prior to the Winona, Minn., mishap Aug. 29, Northwest was planning the retirement of all DC-3s from passenger service on Sept. 1, believing this would permit broader service at lower costs. Instead, the grounding of the 2-0-2s has led to extraordinary costs and probably will leave its imprint in operating losses.

► **Answer**—Northwest was the first of the newly designated "Big Five" to answer the Civil Aeronautic Board's show cause order of Mar. 29 proposing a new rate formula for this group. (AVIATION WEEK, Aug. 16). This order was greeted with violent objections by all of the carriers involved. Northwest now probably will file a supplement to its initial statement, giving effect to the aftermath of the Winona accident.

In its Mar. 29 statement, the CAB, in viewing the groundings of the DC-6 and Constellation, made no attempt to estimate the effect of such action on the earnings of the carriers involved. Of greater consequence, the Board made no provision for reimbursing the carrier for such losses, declaring that "costs attributable to the grounding of aircraft are regarded as a risk to be covered by the rate of return over the extended period during which the type of aircraft will be in service."

► **Exhibits**—Presumably Northwest will seek to recover the operating losses caused by the 2-0-2 grounding and submit supplementary exhibits to this effect.

In its initial statement, Northwest disclaimed that it is comparable to the "Big Four." It alleges that while now a transcontinental carrier, it is only a newcomer in this field and has all the disadvantages of a newcomer in the majority of the large markets: i.e., New York, Washington, Detroit, Cleveland and Pittsburgh, where it is forced to compete with old established carriers. The other transcontinentals allege that many of their difficulties were created by undue competition.

Objection is taken to the Board's finding that Northwest has had a rapid growth in revenue traffic in that this finding implies that the rapidity of such growth has remained relatively constant for the 12 months ended Dec. 31, 1946, and for the 12 months ended Sept. 30, 1947. Attention is directed to the fact that Northwest was the only one of the five carriers which had a decrease in revenue ton miles in the 12 months ended September, 1947, as compared with the year ended in December, 1946. Furthermore, evidence is presented that the carrier has had a steady decline in the volume of both revenue ton miles and revenue passenger miles since the early months of 1947.

► **Exception**—Interesting discussion centers around Northwest's exception to the projected passenger load factor figures used by the Board. The company asserts that air carriers do not receive passenger revenue from their load factors but from the number of passengers they carry per mile. In other words, it makes a difference whether the aircraft is a Constellation or a DC-3.

The exception taken to the Board's criticism of the airlines' failure to adjust passenger fares is interesting in view of subsequent events. Prior to the recent wave of adjustments, Northwest raised its fares three times while the "Big Four" and others did the same only on two occasions. Northwest, therefore, claimed to be in a more critical condition than the others insofar as seeking additional passenger revenues through higher fares.

► **Fares**—Northwest's fare structure has consistently been higher than the other transcontinental operators. For example, Northwest's average fare on its domestic system was 5.7 cents per passenger mile compared with about 5.5 cents for the others. This condition resulted from the lack of competitive routes for Northwest in certain areas. But where point to point competition prevails, as between Chicago and Seattle, for example, fares remained on a competitive par.

Northwest, effective Sept. 1, instituted a uniform 10 percent fare increase. United and TWA have done the same. With American establishing the pattern by placing all fares, regardless of equipment flown, at 6 cents per passenger mile, United followed suit for its DC-6 equipment. Further, all carriers involved now offer a 5 percent discount for round-trips.

Northwest, however, appears to be at a temporary disadvantage in not having any equipment that can compete with American and United's DC-6s as well as Convair-Liners flown by American.

The Board statement—"our consistent policy in the past of determining fair and reasonable mail rates on the basis of results over an extended period of time rather than on a basis of a keyhole view"—is adopted by Northwest as an argument in its favor.

► **Challenge**—Northwest challenges the Board's treatment of its operating profits. From Jan. 1, 1942, through Sept. 30, 1947, the Board declared that Northwest averaged 12.86 percent as a rate of return before taxes on average invested capital. Northwest now contends that profits realized during the period 1942 through 1945 were obtained during the abnormal war period. In 1947, the company sustained operating losses of $1,627,374 on its domestic system. This loss exceeded the operating profits realized in any of the years 1942, 1943, 1944 or 1945.

One of the most significant assertions made by Northwest is its inference that it is not in the same category as the "Big Four," hence should not be accorded the "uniform service rate." Instead, the airline declares that it is in the "need" category and should be so treated in regard to mail compensation.

To prove this, Northwest presents extensive exhibits showing that it is far more comparable in size to such carriers as Capital, Delta and Braniff. In this manner, Northwest presumably expects to establish its claim to subsidy mail pay.

► **Climate**—Much is made of Northwest's peculiar geographical and climatic differences as compared with other carriers. It is asserted that heating and insulating costs, the expense of starting and keeping equipment in operating condition in sub-zero temperatures, the loss of efficiency of personnel, inevitable delays and loss of business on account of conditions are apparent in adding to the company's operating costs.

Under the Board's show cause order, Northwest currently receives a temporary effective rate of 70.90 cents a ton mile. Northwest requested $1.56 a ton mile to offset its previously projected loss. Presumably, this requested rate may now be revised upwards in view of recent events caused by the 2-0-2 mishap.

—Selig Altschul

Productivity Comparison of Planes*

	DC-3	Convair Liner	2-0-2	DC-4	DC-6	Constellation
Max. Gross Wt.	25,200	40,500	39,900	72,000	90,000	90,000
Capacity Payload (Tons)	2.5	4.8	4.5	7.6	7.8	7.8
Cruising Speed	160	240	219	210	250	250
Capacity Payload per hr. (Ton Mi.)	400	1152	985	1596	1950	1950
Productivity	100	300	250	400	500	500

*ALPA estimates.

Newer Planes Mean Fewer Pilots

Larger and faster aircraft carry more passengers, but crewmen worry over declining personnel needs.

By Charles Adams

The air transport industry's technological progress is proving to be a mixed blessing to the men in the cockpit.

While recognizing that development of larger, faster and more efficient aircraft is vital to airline growth and prosperity, the pilots are showing justifiable anxiety over what the new planes mean in terms of their future security. According to studies made by the Air Line Pilots Association, technological unemployment has changed "from a faint spectre to an increasingly-grim reality during the postwar period.

► **Radio Operators Involved**—The pilots are not alone in facing the problem. Only last month Pan American Airways narrowly averted a strike by 300 CIO Transport Workers Union employes arising from the layoff of 50 radio officers. In announcing settlement of the dispute and payment by PAA of $30,000 to 25 of the radio officers, an arbitrator reported the men were laid off "because of technological advances made in the handling of flight communications."

Meanwhile, the Air Transport Association fears the spread of technological unemployment will mean stronger pressure by airline unions for "featherbedding" provisions in their contracts to protect the jobs of their members. ATA raised the issue in its fight against CAB regulations which require utilization of flight engineers after Dec. 1 on all transports used in scheduled service and certificated for more than 80,000 lb. maximum takeoff weight.

► **Pilots Make Study**—ALPA has made surveys showing that twin-engine and four-engine planes which are replacing the DC-3 on the domestic airlines have from two and a half to five times the payload productivity of the Douglas workhorse. The union points out that both the DC-3 and DC-6 use the same number of pilots, although the former has a 2.5-ton payload capacity and a 160 mph. cruising speed, compared to a 7.8-ton payload capacity and 250-mph. cruising speed for the latter. Thus two pilots, with one DC-6, can perform the work of ten pilots in five DC-3s.

As the carriers continue to replace their DC-3s with larger and faster equipment, more and more pilots will be displaced unless airline traffic expands sufficiently to take up the slack. The required expansion seems unlikely, since domestic passenger business has shown little increase during the past 15 months.

Consequently, American Airlines' announcement that by 1949 it will have completely replaced its obsolete equipment with "an entire new fleet of efficient 300 mph. aircraft" brought few cheers from job-hungry pilots. Eastern Air Lines' recent purchase of five additional 60-passenger Constellations—bringing its total Connie fleet to 20 by next fall—also had serious implications for pilots of the carrier's 18 DC-4s and 51 DC-3s.

► **Ten-Year Trend**—The number of airline pilots employed by the certificated domestic airlines increased from 1117 in 1938 to 4875 last year, according to ALPA. With 1938 equalling 100, the pilot employment index stood at 436 in 1947.

By comparison, available seat miles on the domestic airlines soared from 951,458,000 in 1938 to 9,152,389,000 last year, bringing this index to 962 at the end of the ten-year period. Number of planes operated domestically rose from 253 in 1938 to 752 last year, representing an index change from 100 to 297.

Thus, with 2.97 times as many planes and 4.36 times as many pilots, the domestic airlines in 1947 flew 9.62 times as many available seat miles as in 1938. If in 1947 the carriers had the same types of equipment they used in 1938, they would have needed 2436 planes instead of the actual 752 aircraft to fly their 9,152,389,000 available seat miles. And instead of 4875 pilots they would have required at least 10,718.

Employment Drops—A significant aspect of ALPA's survey is the sharp drop in pilots from a peak of 5624 in 1946 to 4875 in 1947. At the same time, available seat miles flown by the domestic airlines increased from 7,556,469,000 to 9,152,389,000.

ALPA reports that American Airlines, which had 1265 pilots and copilots in 1946, had 835 pilot employes on the company payroll in the first half of 1948. In 1946, United Air Lines employed 996 pilots against 899 this year.

Another problem resulting from airline technological advancements is the slowup in promotions for copilots. In fact, many captains displaced with the substitution of newer equipment have been reduced to copilot status, ALPA

Domestic Airline Expansion Index*

(1938 equals 100)

Year	Scheduled Miles	Available Seat Miles	Pilots	Planes
1938	100	100	100	100
1939	120	128	124	105
1940	159	191	156	142
1941	194	246	185	142
1942	160	206	196	71
1943	150	195	251	77
1944	207	266	258	115
1945	303	401	445	164
1946	455	794	503	251
1947	446	962	436	297

*ALPA study.

states. Those at the bottom of the seniority list have been laid off. This means that former captains must again revert to captain status before any of the old copilots have a chance at promotion to captaincy.

► **Copilot Rut**—American Airlines, in the forefront with acquisition of new equipment, has a ten-year copilot in Los Angeles, according to ALPA. On many other airlines there are copilots of five to seven years standing.

Not too long ago, airline copilots were almost certain of becoming captains within one to four years. Now, some pilots must look forward to spending their entire flying careers as copilots.

Suspension Seen For AAA Route 49

Evidence is increasing that 118 cities and towns in Pennsylvania, West Virginia, New York, Kentucky, Delaware and Ohio may lose the mail and express pickup services now furnished by All-American Aviation.

CAB Examiner Warren E. Baker has recommended that the carrier's certificate for Route 49, involving five segments radiating out of Pittsburgh, be suspended indefinitely. He cited the high subsidy expense borne by the government, relatively small benefits derived by the public, and the improbability that traffic will show marked improvement in the future.

► **CAB Investigation**—The report was another step in an investigation instituted by CAB in May, 1947, to determine whether service should be continued over the nation's only pickup system. In March of this year, All American asked the Board's permission to suspend service on part or all of the routes, which it has operated since May, 1939.

AAA's move followed CAB's action last February designating the company for 1550 miles of conventional feeder routes in the same general Middle Atlantic area now covered by the pickup links. In selecting AAA to operate the feeder system, the Board said the new service could not be inaugurated until duplicating pickup routes were modified, suspended or abandoned. All American's request for suspension of its pickup services was contingent on extension of its feeder system to New York City.

► **No Precedent**—Tackling the legal aspects of the case, Examiner Baker noted that the proceeding was without precedent. CAB has often suspended service at individual points or even over entire routes in the past. But these suspensions did not involve a whole certificate and were based on emergency factors such as the wartime shortage of equipment or inadequate airports.

Baker said that CAB has authority to suspend AAA's certificate even without the carrier's consent. Thus the condition which All American attached to its request for suspension of the pickup service apparently has little actual significance.

► **Post Office Position**—The Post Office Department vigorously endorsed suspension of the AAA pickup routes. It told CAB that during the first half of 1948 it paid All American 7.25 cents for each piece of mail flown by the carrier.

This was more than the average revenue derived from each letter and left nothing for Post Office handling expenses or payments to carriers transporting the mail from AAA's terminal points to other parts of the country. All American had a $62,003 operating loss during the first half of 1948 and is seeking more mail pay.

AAA hopes to be able to inaugurate service over its conventional passenger-mail-cargo feeder system next February or March. Company directors have authorized purchase of three additional DC-3S to augment six others bought recently.

(No formal request for the change in All American's name to All American Airways, recently voted by AAA stockholders (AVIATION WEEK, Sept. 27), had been received by CAB early last week.)

Commuter Plan Catches

Mid-Continent Airlines' commuter fare plan (AVIATION WEEK, Sept. 27) is taking the industry by storm.

By early last week, American Airlines, United, Western-Inland, National, Northwest and TWA were on the bandwagon. There were indications that other carriers including Chicago & Southern, Northeast and PCA would file similar plans with CAB for approval shortly.

MCA's commuter fares were announced following a ruling by the Bureau of Internal Revenue that the 15 percent federal transportation tax does not apply to this type of travel. To be eligible for the tax saving, the commuter must make a minimum of two roundtrips, or four one-way trips, between a pair of points within a 30-day period.

Going in effect Oct. 15, Mid-Continent's commuter tariffs will be valid between 11 pairs of cities. Besides the tax saving, MCA will offer the commuter an additional 7 to 10 percent discount on books of 6 to 8 tickets.

American, United, TWA, Western and others intend to make the commuter plan system-wide. Besides the 15 percent tax saving, the commuter buying a book of four tickets issued by these carriers can take advantage of the regular 5 percent roundtrip discount. The tickets are not transferable.

Florida Line Fights To Keep Operating

Florida Airways President Joseph L. Dyer has not given up the fight to keep his feederline operating after next Mar. 28 despite a recent Civil Aeronautics Board decision which would terminate the franchise on that date (AVIATION WEEK, Sept. 13).

"CAB's policy change as exemplified in this first decision on extension of a feederline is a grave error," Dyer declared. "This decision is not based on the proven needs of the public nor requirements for national defense. Not only is Florida Airways affected but so are all the other local service carriers in the country. We do not think a fair trial of the feeder experiment in Florida can be made in 14 months over only 470 miles of route to 12 cities."

► **Communities Protest**—Florida cities affected by CAB's decision have already protested to the Board and have asked that the case be reopened. The state's Congressional delegation is also expected to criticize the CAB action.

Meanwhile, Southwest Airways has followed Pioneer Air Lines' lead in asking CAB to make permanent its three-year feeder certificate. Both franchises expire in November, 1949.

► **Southwest Acts**—President John H. Connelly said small cities and towns on Southwest's routes between Los Angeles and Medford, Ore., have generated more business than his company predicted when it originally aplied for a short-haul certificate. He declared that Southwest has with remarkable monthly regularity carried more passengers, achieved higher load factors and made greater use of its available ton miles than any other feeder.

Monarch Air Lines, which is now fighting to hold its certificate after next Mar. 31, received a boost from the Post Office Department this month. The Department announced it did not object to extension of MAL's franchise to Mar. 30, 1950.

Leased C-46s

First of ten Curtiss C-46 cargo transports leased by Pan American Airways from the Air Force is being used for pilot training and familiarization flights in Miami. The ten planes will soon be put on PAA's Latin American routes.

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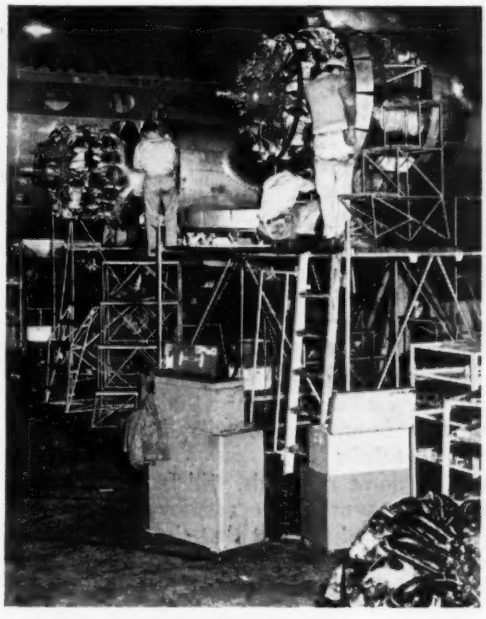
trouble-free miles around the globe!

Southwest Airmotive mechanics and technicians who overhauled the "Sky Merchant" for its 50,000-mile 'round-the-world flight. The Atlas aircrew stands at right.

Over seas, deserts, and mountains of 28 countries, the Atlas Supply Company's DC-4 "Sky Merchant" flew around the globe on a unique mission of goodwill. Aboard were crewmen, Atlas representatives who displayed the company's famed automotive and aeronautical products, and 17 American business men who gained valuable first-hand impressions of conditions abroad.

One hundred days and 50,000 miles after the journey's start, the Douglas' wheels touched home base again in USA. It had flown through every conceivable kind of weather, through wide extremes in temperature and on-and-off runways of myriad descriptions. Not once did the aircraft or its SAC-installed engines develop mechanical trouble.



From the Atlas aviation experts, there was nothing but praise. They gave much of the credit for a trouble-free trip to Southwest Airmotive where the "Sky Merchant" received a major going-over.

This record reflects the same dependable service which for 16 years has kept air fleets flying safely and surely throughout the Western Hemisphere. Check with Southwest Airmotive before your next aircraft or engine overhaul.

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LOVE FIELD, DALLAS

Alaska Cargo

Maritime walkout makes minor "Operation Vittles" of Territory flights.

Harry Bridges' explosive Longshoremen's Union has given rise to another "Operation Vittles."

A small-scale version of the Berlin airlift has been handling steadily increasing quantities of freight between the Pacific Northwest and Alaska since the dock workers began their West Coast strike more than a month ago. Both certificated and noncertificated carriers stepped into the transportation breach created by the shipping tieup, which also boomed airline business between California and Hawaii.

▶**CAB Acts**—Late last month—about three weeks after the walkout began—CAB issued special exemption orders authorizing Pan American Airways, Northwest Airlines and approximately 17 carriers certificated within Alaska to make unlimited number of flights between Seattle and points in the territory on or off their routes. The exemptions, which terminate Nov. 1 unless extended, were granted at the request of the Secretary of the Interior and the Governor of Alaska "to alleviate an imminent shortage of food and other essential supplies in Alaska resulting from the strike."

Nonscheduled carriers flying between the Pacific Northwest and Alaska had applied for just such broad operating authority during the crisis. But CAB decided that the exemption for the certificated lines would suffice for the present.

▶**Cargo Volume Soars**—Pan American Airways, operating from Seattle to Ketchikan, Juneau, Fairbanks and Nome, estimated the strike would increase its cargo volume to Alaska by 50 percent. With five DC-4s available at Seattle, PAA had considerable capacity for extra sections when the walkout began, and was quick to expand its service.

The carrier was also doing well on its southbound backhaul, which is often light on the Alaskan run. During one five-day period last month it flew nearly 1000 passengers (mostly fishermen) from the Territory to Seattle.

Northwest Airlines, certificated between Seattle and Anchorage, had considerably less space available. Its ability to offer more service during the emergency has been hampered by the Martin 2-0-2 grounding, which created a tight equipment situation.

▶**Nonskeds Participate**—Alaska Airlines, the largest nonscheduled operator on the Pacific Northwest-Alaska run, also found itself handicapped when the strike broke. Shortly before the walkout, a Federal judge at Anchorage ruled that AA's cargo operations between Anchorage and Seattle has been in violation of CAB's regulations governing flight frequencies and regularity. He enjoined the carrier from further infractions of the nonscheduled exemption. (An injunction has been set aside temporarily.) But now, since it is one of the 17 carriers certificated within Alaska, Alaska Airlines has full authority from CAB to make scheduled trips to Seattle during the strike emergency.

Small nonscheduled lines on the Pacific Northwest-Alaska run (some of whom have only a single DC-3) immediately sensed a bonanza in the shipping tieup. Many recalled a similar emergency during the fall of 1946 when an eight-week-long maritime strike boosted northbound cargo business to more than 250,000 lb. weekly.

Some nonskeds expected freight traffic between the Pacific Northwest and Alaska to aggregate 1,000,000 lb. weekly if this year's strike lasts as long. One uncertificated operator estimated the walkout would increase his cargo business by at least 500 percent.

▶**Appeal to Board**—To protect themselves against a CAB crackdown, ten nonscheduled operators (not certificated within Alaska) last month appealed unsuccessfully to CAB for an exemption to fly between Seattle and Alaskan points without regard to regularity and frequency as long as the shipping emergency continues. They were Air Transport Associates, Arctic-Pacific, Inc., Arnold Air Service, Aviation Corp. of Seattle, Pacific Alaska Air Express, Ranier Air Freight Lines, Seattle Air Charter, Standard Air Cargo, Yakima Sky Chief and Totem Air Service.

Two other irregular operators, Mt. McKinley Airways and Golden North Airways, whose applications for more liberal exemptions were turned down early last month, asked for reconsideration of the decisions in the light of the maritime situation. Both operators were cited by CAB last summer for violating the nonscheduled regulations (AVIATION WEEK, July 26).

▶**Conditions Change**—While the certificated carriers between the U. S. and Alaska were unable to meet the demands for air transportation imposed by the 1946 strike, Pan American informed CAB that conditions are different now. In opposing any new exemption for the irregular operators, PAA told the Board it is handling all Alaska-bound passengers and cargo offered to it, "and there is no basis for finding that we will not be able to do so in the future."

Pan American has greatly increased its cargo operations from Seattle to Alaska during the past year. During 1947, when its emphasis was almost entirely on passengers, PAA carried 30,000 lb. of cargo northbound during its best month. But with lower rates and new all-cargo flights, the carrier hauled an impressive 403,673 lb. northbound last July.

Some nonskeds, still free from court orders or CAB crackdowns, made no bones of the fact that they intended to fly between Seattle and Alaska as often as they had loads during the strike

AIRLINES EXPAND TRUCKING FLEET

Rapid expanding freight volume handled by the domestic airlines has been accompanied by a similar growth in the carriers' fleet of pickup and delivery trucks. This trailer-truck, first of its size to wear the Air Cargo, Inc., insignia, has been added to the pickup and delivery fleet operated in Los Angeles by one of the many trucking companies affiliated with the certificated airlines' ground service organization. During the first half of 1948, the 16 domestic trunklines flew about 30,000,000 freight ton miles, up almost 150 percent over the same period last year.

emergency. They reasoned (perhaps fallaciously) that even though CAB refused to grant a broader exemption it would not take action against them for helping meet Alaska's needs during a crisis.

▶**Flights to Midwest**—While Alaska Airlines has been enjoined from too frequent trips between Seattle and Alaska except during the emergency, it is varying its services with flights between Minneapolis and Anchorage. Together with Northwest, which is certificated between the Twin Cities and Anchorage, Alaska Airlines flies sizable quantities of meat and other farm produce from the Middle West to the Territory.

To Alaska Airlines and other nonscheduled operators belongs much of the credit for freeing Alaska from complete dependence on surface shippers who often seemed to set their rates by what the market would bear. Despite PAA's recent rapid development of cargo services, Alaska Airlines last summer was probably carrying more freight into Anchorage than all other carriers combined. Last year, 61 percent of the company's revenue was derived from cargo.

Southern Airways Asks Feeder Certificate

Southern Airways, Birmingham, Ala., has petitioned the Civil Aeronautics Board to issue the feeder certificate for which it was designated in the Southeastern States area decision in April, 1947.

The original authorization provided for service between Memphis, Tenn., and Charlotte, N. C.; Atlanta, Ga., and Jacksonville, Fla.; and Columbus, Ga., and Charleston, S. C., contingent on a showing that airport facilities are adequate along the routes. Frank W. Hulse, president of Southern Airways, has informed CAB that airports adequate for DC-3 operations are now available at 20 of the 23 cities his company is authorized to serve.

Communities which cannot be served immediately because of airport conditions are Tupelo, Miss., and Rock Hill and Orangeburg, S. C. Twelve of the 23 cities on Southern's routes are served currently by certificated airlines.

Hawaii Separation

Inter-Island Steam Navigation Co. is considering separation of its surface interests from its wholly-owned subsidiary, Hawaiian Airlines. A CAB examiner recently recommended certification of another carrier in the Hawaiian area because of Inter-Island's alleged transportation monopoly.

Britain Eyes the Transport Future

Supply minister sees world leadership in field when nation reaches peak of output on new civil aircraft.

When Great Britain attains full production on its new type planes in the early 1950s it will take over world leadership in the air transport field, in the opinion of Supply Minister George Strauss.

Speaking before Vickers-Armstrong aircraft workers in connection with the recent press showing of the four turboprop Viscount transport (AVIATION WEEK, Aug. 30), Strauss said he was confident that developments during the next few years would more than vindicate his government's present policies. He apparently referred to the government's decision to furnish British Overseas Airways Corp. with American equipment, such as the Lockheed Constellations and Boeing Stratocruisers.

▶**Bitter Opposition**—This "Buy American" instead of "Buy British" policy of the past two years has met widespread and often bitter opposition from all sections of the British aircraft industry, members of Parliament, the press and the public. British aircraft manufacturers argue that if money is to be spent it should be used in developing new type transports which would serve a long-term policy, and scarce American dollars should not be used on U. S. equipment which probably will not remain in active service much after 1952.

But the Ministry of Supply, in conjunction with the Ministry of Civil Aviation, acted on the strongest recommendations from civil service experts. Foremost among these is Peter G. Masefield, first postwar British civil air attache in Washington, who returned to England in early 1947 to take up the newly-created post of Director-General of the Directorate of Long Term Planning and Development.

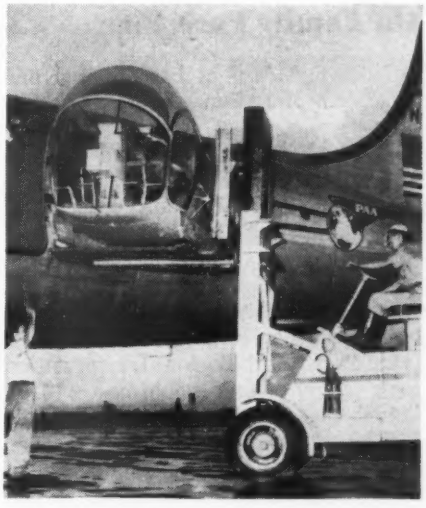
While in the U. S., Masefield made a thorough study of American air transport developments. As a result, he was called on to advise high government officials as to the merits of every American transport which was coming off or due to come off the production line.

▶**World-Wide Survey**—Further, Masefield made trips around the world to get first-hand experience covering the various conditions that new transport aircraft would meet on regular commercial schedules. He discovered that in many instances the new British types would be unable to use some of the existing main trunkline runways and that in any case some of these new aircraft would be totally unsuited for operation and maintenance under the rigorous conditions of commercial usage.

Masefield made the strongest possible recommendation for the temporary use of first-class American equipment, especially on the north-Atlantic run, so that BOAC could continue to operate in the face of stiff U. S. and European competition. The fact that BOAC has continued to operate successfully on the Atlantic route is considered sufficient justification for the "Buy American" policy.

▶**Future Transports**—Minister Strauss' speech echoed the hope of Masefield and others intimately connected with the future of British prestige on long-distance routes that England's new turboprop and turbojet transports will be available in sufficient quantities to meet British requirements and possibly leave something over for anxious buyers should American manufacturers not be in a position to retaliate.

In particular, Strauss and the Directorate of Long Term Planning and Development are looking to the highly-touted de Havilland D.H. 106 four turbojet transport as the goose that will lay the golden eggs. Indicative of this hope is the fact that the D.H. 106 is completely shrouded by a secrecy which rivals anything that has been put around a supersonic plane.



COPTER CARGO

Cargo for this Pan American plane was three helicopters going from Bell Aircraft Co.'s Buffalo, N. Y. factory to Sao Paulo, Brazil. Pan Am picked the copters up in Miami (picture shows one being loaded) and flew them to Sao Paulo where they will be used in crop dusting and in widespread campaign against insect pests.

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Troubles Stand in Way Of New York Feeders Start

Financial and equipment troubles are holding up inauguration of service by two short-haul carriers in the metropolitan New York area.

One of them—Island Air Ferries—started weekend service on route segments (MacArthur Field, L. I., to New London, New Haven and Bridgeport, Conn.) July 15, but discontinued this September 19. Their lone DC-3 now performs sightseeing duty from New York International Airport. Certificated to operate without mail pay (AVIATION WEEK, Sept. 13), the carrier is now undergoing financial reorganization. It expects to be able to commence full operation of its routes sometime next March.

Island Air Ferries had intended to start operations June 1. Fred H. Smith, president, and also manager of MacArthur Field, originally had three DC-3s, but a 29-month wait for certification made it necessary to sell two. The carrier intends to purchase additional aircraft.

Air Commuting, which intended to use Grumman Mallards operating from New York's East River, has sold its aircraft, and now is considering the possibilities of using helicopters.

Air Commuting originally asked CAB for a certificate for 334 helicopter route miles in metropolitan New York. (AVIATION WEEK, Sept. 29, '47).

NEA Puts New Twist On Family Fare Plan

Northeast Airlines has adopted and expanded American Airlines' Family Fare plan.

A new NEA tariff approved by CAB will enable one full-fare adult to take with him at half fare any other adult of his immediate family and any children under 21. The family fares will be in effect Mondays through Fridays except on flights leaving before noon on Monday or Friday. At the regular rates, New York-Boston transportation for a family of four would cost $40.40. Under the new tariff it will cost only $25.25.

Under American's plan, one regular-fare ticket purchased by an adult permits the husband or wife of the full-fare passenger and children 21 years of age or less to travel at half price on Mondays, Tuesdays or Wednesdays. AA Vice President-Sales R. E. S. Deichler has announced that the response to the offer has been "tremendous," and first of the week load factors have increased considerably since the plan went into effect Sept. 13.

Lift for Wallace

Standard Air Lines, nonscheduled transcontinental carrier, is giving a lift to a Presidential candidate for the second time during the current campaign. Henry Wallace, Progressive party nominee, plans to travel more than 8500 miles in a chartered SAL DC-3 in his final swing around the country this month. Last summer, Standard carried Gov. Thomas E. Dewey to the celebration marking the opening of New York International (Idlewild) Airport.

Globe Resumes Service

Globe Freight Airline, Hartford, Conn., has resumed its scheduled all-cargo operations between Boston, Hartford, New York, Philadelphia, Baltimore, Richmond, Charlotte, Atlanta, Birmingham and New Orleans using C-46F equipment leased from the Army. Active for 15 months during 1946 and 1947, Globe suspended service in June of last year chiefly because of the rate war, according to James N. Laneri, president.

The company has signed an agreement with TACA for exchange of cargo at New Orleans, and other interline pacts are pending.

E. R. C. Milliken, formerly with Riddle Aviation and Skyways International, has been appointed general traffic manager.

CAB Reconsiders

CAB has reopened the case in which it decided over a year ago to authorize transfer of Western Air Lines' Route 68 (Denver-Los Angeles) to United Air Lines. The Board's initial decision was predicated on a finding that employes would not lose their jobs because of the transfer, but the Air Line Pilots Association, Airline Mechanics Division, UAW-CIO, and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employes claim a number of their members have been adversely affected by the deal.

CAB will determine what employe-protecting conditions should be attached to its approval of the transfer.

Canadian Lines in Red

Canada's scheduled airlines reported a $1,112,000 deficit in first quarter 1948, against a loss of $1,442,000 in the same period last year.

SHORTLINES

▶ **Alaska Airlines**—Further hearings on the carrier's fatal DC-4 accident at Seattle-Tacoma Airport on Nov. 30, 1947, were to be held late last week.

▶ **Braniff**—Has asked CAB to amend its certificate from San Antonio and Laredo, Tex., to Mexico City to extend the link to Balboa, Canal Zone, via Guatemala City, Guatemala; San Salvador, El Salvador; Tegucigalpa, Honduras; Managua, Nicaragua; and San Jose, Costa Rica, Braniff has not yet received permission from the Mexican government to activate its present link.

▶ **Empire**—CAB has made final the order of Aug. 25 awarding the carrier $1,126,715 (88.16 cents a plane mile) in mail pay for the period Sept. 28, 1946, through Feb. 29, 1948. This represents a $400,000 increase over the previously effective temporary rate and gives Empire a 7 percent profit on its recognized investment for its first 17 months of service. CAB's latest order also confirms the new sliding scale mail rate starting Mar. 1, 1948. . . . Company has been authorized to suspend service temporarily at Pullman, Wash.-Moscow, Ida., because of deterioration of the airport's single runway.

▶ **Globe Freight Airline**—Has signed an interline agreement with the Flying Tiger Line. Globe recently resumed service between Boston and New Orleans after being inactive more than a year.

▶ **Inland**—Has been denied authorization to suspend service between Rapid City, S. D., and Sheridan, Wyo., between Oct. 1, 1948, and May 31, 1949.

▶ **Pan American**—Will institute daily Constellation service between New York and Puerto Rico around the middle of October. Flights will be in addition to regular thrice-daily DC-4 service and the recently-inaugurated, low-cost, tourist-class DC-4 operation.

▶ **Robinson**—Has been authorized to suspend service at Middletown, N. Y., until airport facilities are adequate. Company recently inaugurated flights over its certificated feeder system.

▶ **Southwest**—Has asked CAB to give it equal opportunity with Arizona Airways to acquire Western Air Lines' San Diego-Yuma, Ariz., route segment.

▶ **TWA**—States it will not become involved in constant passenger fare changes "for slight temporary advertising advantages." Company says it intends to keep the half-cent premium fare on its Constellations despite American's and United's decision to remove the surcharge from their DC-6s.

▶ **United**—Flew 131,941,000 revenue passenger miles in August, up 5½ percent over July but down 6½ percent from August, 1947.

CAB SCHEDULE

Oct. 4—Hearing on CAB's investigation of free and reduced rate transportation. (Docket 2737 et al.)

Oct. 4—Oral argument on additional intra-territorial service in Hawaii. (Docket 2390 et al.)

Oct. 5—Hearing on approval of control of Parks Air Lines. (Docket 1670.)

Oct. 11—Prehearing conference in reopened case involving sale of Western Air Lines' Denver-Los Angeles link to United Air Lines. (Docket 2839.)

Oct. 11—Hearing on Board's investigation of Monarch Air Lines' certificate termination date. (Docket 3368.)

Oct. 12—Hearing on need for service to Socorro, Hot Springs and Las Cruces, N. M. (Docket 3271 et al.)

Oct. 18—Oral argument in all-expense "Skycruise" case. (Docket 2377 et al.)

Oct. 18—Hearing on Board's enforcement action against Standard Air Lines. (Docket 3357.)

Oct. 25—Oral argument in Latin American route amendment case. (Docket 2811 et al.)

Oct. 25—Hearing in U. S.-Alaska service case. (Docket 3286 et al.)

Oct. 26—Hearing on transfer of Western Air Lines' San Diego-Yuma route segment to Arizona Airways. (Docket 3440.)

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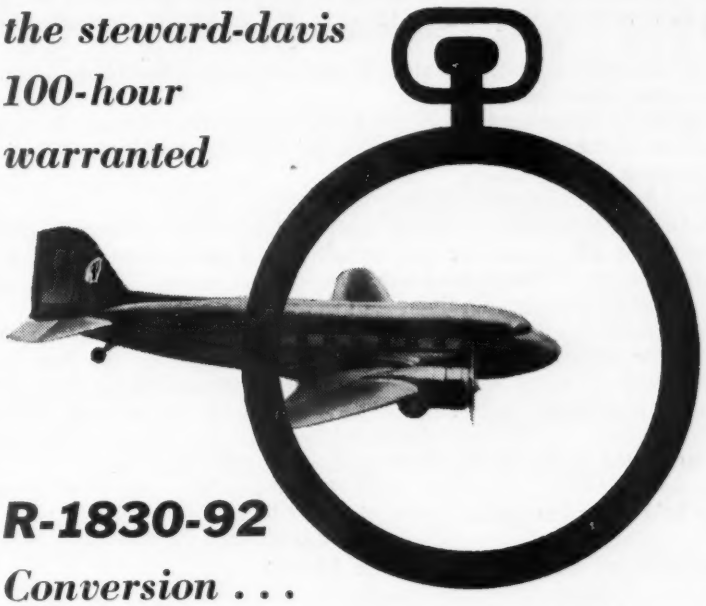

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STRICTLY PERSONAL

IS IT UNETHICAL TO TELL THE TRUTH? The seeker of truth in aviation hath troubles. Pity the readers—and the writers—of aviation news these days.

On excellent information, AVIATION WEEK's **Industry Observer** told our 32,000 paid-in-advance subscribers Sept. 20:

"McDonnell's swept-wing XF-88, a USAF penetration fighter, is undergoing flight tests at Muroc. This experimental model is powered with two Westinghouse 24C jet engines . . ."

The next day an aviation newsletter said:

"The Air Force (said) today that a report published in a weekly aviation trade magazine to the effect that the McDonnell XF-88 penetration fighter is undergoing flight testing at Muroc Air Force Base, Cal., is untrue. The plane, although completed and almost ready for flight testing, has not yet made a flight."

Apparently the Air Force didn't read what its own Four Star Gen. Muir S. Fairchild, vice chief of staff, said in an address written for the San Francisco squadron of the Air Force Assn. meeting at the Whitcomb Hotel, Sept. 17:

"Another McDonnell aircraft, the XF-88, one of our newest experimental penetration fighters, has successfully passed its initial flight tests at Muroc."

Someone in the Air Force is kidding someone in the Air Force.

It reminds us of last December when the commanding officer of Muroc told the press he'd never heard of a supersonic flight by the then XS-1. The following June Mr. Symington announced officially that the XS-1's first supersonic flights had been accomplished in October—over Muroc!

And a few weeks ago before we printed the first story about the XF-86 exceeding the speed of sound, we showed it first to a high Air Force official who not only said he had no such reports, but that the plane wasn't even designed to go that fast.

We sent the story to the printers anyhow, and the next day received unofficial verification of the first XF-86 supersonic flight. The ship that wasn't designed for supersonic has repeated its accomplishments again and again.

But not all of the denials of stories are by Air Force personnel.

We recall the time we forecast an AAF order for a designated batch of big bombers and the public relations spokesman not only denied it, but said such reports made us look ridiculous in the eyes of the industry. Months later his own press release verified the story.

The other day we reported that a certain firm is building a certain power plant for a certain plane. The company's spokesman has denied it. An informal recheck indicates we are right. Maybe someday a press release will settle the matter.

These ancedotes and others which will appear here from time to time are not inspired by self-pity. They are meant to give you readers a glimpse behind the scenes of aviation news gathering, and the difficulties that are—rightfully or wrongfully—put in the way of writers and editors in this field. Is it unethical for the press to tell the truth? Believe it or not, there are those who think it is.

* * *

BEHIND THE NEWS—In the interest of fair play, **J. L. Nollan**, assistant timer at North American Aviation, Inc., brings up to date a report on a National Air Race event. He says: "Let it be noted that a Major DeHaven flying an F-80 claims he took off unofficially at Long Beach at 10:32 and was unofficially clocked in at Cleveland at 14:41 for an elapsed time of 4 hours, 9 minutes, beating the FJ by one minute. Actually, he was timed by the assistant starters at 10:27 take-off, or some five minutes longer. Thus, he took at least four minutes more than the FJ and is not the unofficial winner of the jet division of the Bendix race, as the news claimed."

* * *

FATALITIES & SPIN-PROOF PLANES—In case AVIATION WEEK's Ercoupe story Aug. 2, page 35, gave you a wrong impression, we report two letters. **Alfred K. Young**, flight operations agent for CAA's District Office of Aviation Safety at Oklahoma City, points out that we said "no fatal accident occurred in 1947 in spin-proof planes." **Bob Sanders**, president of Sanders Aviation, Inc., at Riverdale, Md., (Ercoupe world-wide distributors) who gave AVIATION WEEK's **Alexander McSurely** the information, says "We quoted the CAA report as saying there were no fatalities from spin-proof airplanes. We should have stated that there were no fatalities attributable to stalls from spin-proof airplanes. It might also be stated that spin-resistant airplanes showed a very marked reduction in fatalities from stall accidents over other airplanes."

R.H.W.

WHAT'S NEW

Trade Literature

"Cincinnati Shears," Catalog S-5 of shears, shapers and press brakes; 32 pages, illustrated. Cincinnati Shaper Co., Cincinnati, Ohio.

"Speed Packing Manual," how to save on shipping costs by using corroflex flexible corrugated material, for either inner or outer packing. Illustrated, 32 pages, plus samples. Sherman Paper Products Corp., Newton Upper Falls (64), Mass.

"Molybdenum—Steels, Irons, Alloys," 391 pages. No price shown. Climax Molybdenum Co., 500 Fifth Ave., New York, N. Y.

"NATA Air Taxis," a list of 432 members of National Aviation Trades Assn., by state and city, who are equipped to offer special passenger or cargo charter service. All hold current operating certificates under Part 42, Civil Air Regulations, and letters of registration to serve as non-certificated irregular air carriers. This list will be revised Dec. 31, 1948, and quarterly thereafter. Copies available free from NATA, 1346 Connecticut Ave., N.W., Washington, D. C.

"Public Finance of Air Transportation," by Richard W. Lindholm, Dept. of Economics, Ohio State University. A study of taxation and public expenditures in relation to a developing industry, with two-fold objective: (1) to assemble and interpret pertinent data bearing on the taxation of a segment of the transportation industry; (2) to analyze and summarize the problems of a new and growing industry under modern conditions of regulation, taxation and subsidy. 178 pages. $2.75. Bureau of Business Research, College of Commerce & Administration, Ohio State University, Columbus, Ohio.

New Reference Books

"Landscape Planting for Airports," by Florence B. Robinson, published by University of Illinois, Institute of Aeronautics, Urbana, Ill. Author is associate professor of landscape architecture at the University of Illinois. Paper cover pamphlet, 32 pages, also contains references to other source material on same subject. Free upon request.

"Wings Around the World," described as "The Story of American International Air Transport." The book was suggested by William Van Dusen Associates; all pictures are furnished by Pan American Airways. Most of the book describes PAA's development. 192 pages. E. P. Dutton & Co., Inc., New York.

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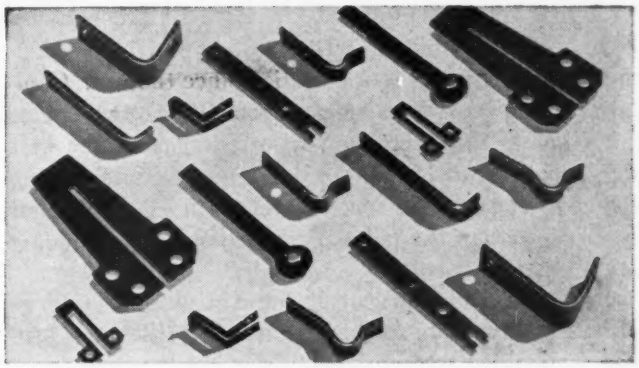

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EDITORIAL

Persuading Millions to Fly

There is no more vital problem for the airlines than persuading the public to use their passenger, cargo and mail services. All of the industry's problems hinge on public acceptance.

Capital Airlines' proposed air coach service between New York and Chicago is the most important development in domestic air transportation since the war. Capital will carry passengers between the nation's two largest cities in less than five hours—contrasting with the best rail coach time of 16 hours, 45 minutes. Despite this big time advantage the air coach traveler will pay only about $2.30 more than the railroad coach passenger, excluding limousine or taxi costs.

Instead of citing the general slump in all forms of transportation as an alibi for higher fares and still more mail pay, Capital has set out to capture as much of the traveling public from ground services as it can. Although frankly experimental, the significance of this innovation by a U. S. scheduled airline should strike the railroad industry with terrific impact. We predict that second class air travel will be in wide use in the U. S. shortly. With the proper public education program and greatest emphasis on the bargain these low fares offer, the airlines should be able not only to carve out for themselves a larger portion of the total travel expenditures but to create business which does not even exist now.

Public education has been ignored generally by the industry. Low fares are a tremendous attraction but millions of people either are afraid to fly or hesitate to take the first unfamiliar step toward a flight merely because of timidity.

The best job of public education we have seen is being done by American Airlines with its DC-6 sightseeing flights. Its energetic sales program, supplemented by the Monday-Tuesday-Wednesday half-fare family flight fares, also includes retailing the DC-6 at city airports.

American's DC-6 publicity program is reminiscent of the early days of the DC-3, when courtesy flights were widely used as an inducement to get travelers on the airlines. But today American is making the scenic trips pay for themselves.

The excursion revival started in New England over the July 4th week-end when it was American's turn to play host at an open house at Boston's Logan Airport. A Convair, A DC-6, and a DC-4 Airfreighter were available for the public to inspect, among other attractions, and the line had a plan to offer half-hour sightseeing flights over the city at $2.50 a ticket. Not much was expected of the flight feature. But before the three days were over, all available equipment, including DC-3s and DC-4s, had been called into use to satisfy the unexpected demand for tickets. In all, 17 flights were operated and carried 754 revenue passengers for a load factor of 91.4 percent. Monday evening, when the demand for tours was greatest, no planes were available for the purpose. Open house attendance was 24,500.

So American decided to demonstrate the Six at other key cities.

"Since the Boston show, walk-throughs and sightseeing flights have been held at Los Angeles and Dallas," the company tells AVIATION WEEK. "Within a short time similar promotions will have been completed at most of American's largest cities."

At Oakland, new gimmicks were to be added to secure advance advertising and additional diversions for the crowds, which have generally been too big to permit everybody either to walk through the Sixes or purchase sightseeing tickets. A similar program was set for Westchester County Airport with a DC-6 and Convair on display.

"The results of the effort to get people to see the DC-6 and take rides in it are unquestioned," one spokesman says. "They have been exceedingly successful and the program is being extended to most of our DC-6 cities. We are hampered in scheduling them very far in advance by equipment scheduling problems, but the company is so sold on this method of putting the DC-6s across to the public that it undoubtedly will be a continuing program."

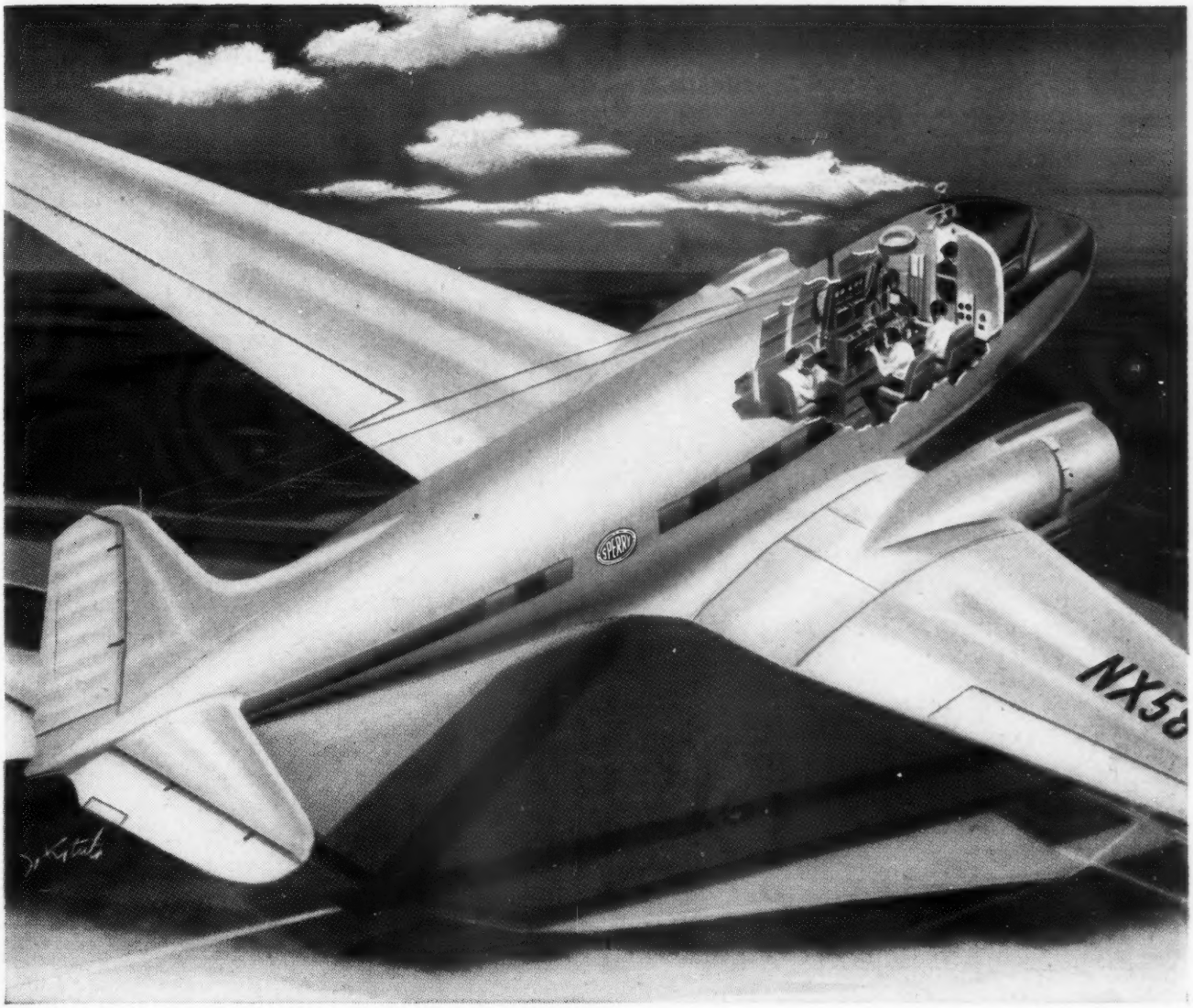
During the first exhibition at Los Angeles, American sold four transcontinental tickets and one trans-Atlantic ticket on the spot to sightseeing passengers who wanted to "try out" flying before committing themselves to long flights. The L. A. exhibition Aug. 22 attracted thousands of walk-through visitors, and 385 who paid for excursion tickets on seven flights with no more advance notice than a one-paragraph publicity story in a daily newspaper. A week later 181 passengers were carried on four DC-6 flights.

Public service is the only excuse for any transportation system. Adequate public usage of the airlines would solve most of the industry's problems. Americans are already airminded. Millions need only slight encouragement or inducement to become regular airline customers.

As we pointed out here Aug. 9, "The public will fly and ship cargo by air under the same conditions it will patronize any other business from pickles to breakfast food." Operate on a strict business basis, give the people a convenient, safe service at a price they can pay.

Let's get back to a policy of private enterprise and commercial competition. Persuade millions to fly. With a national educational program like American's, it would bring the industry new business far out of proportion to its cost. What are we waiting for?

ROBERT H. WOOD



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The "Flight Center" at MacArthur Field, Long Island is supported by the entire Sperry research and engineering organization. These groups — working with the research facilities of the airlines — constantly strive to develop aviation equipment that increases schedule reliability and confidence in air transportation.

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And from knowledge of airline requirements, gained in actual flight, Sperry has developed other equipment such as the Sperry A-12 Gyropilot* for smooth, level flight . . . the Automatic Approach Control to guide every airliner safely down to the runway . . . the Gyrosyn* Compass and other flight instruments for accurate information on position and direction.

Meanwhile, Sperry research and engineering development laboratories are working on tomorrow's aviation problems while finding new and better solutions to today's.

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Our pilot thinks it is the greatest airplane ever built and he has had 6,000 hours in various types of aircraft.

There has never been a mechanical failure of any kind and, with the quality you build into this ship, we consider it the safest sort of transportation. I personally did about 40,000 miles in the Beech myself during the past year, which I mention only to show that I speak as one of the active users.

Sincerely yours,

Kenneth Parker
President
The Parker Pen Company

c

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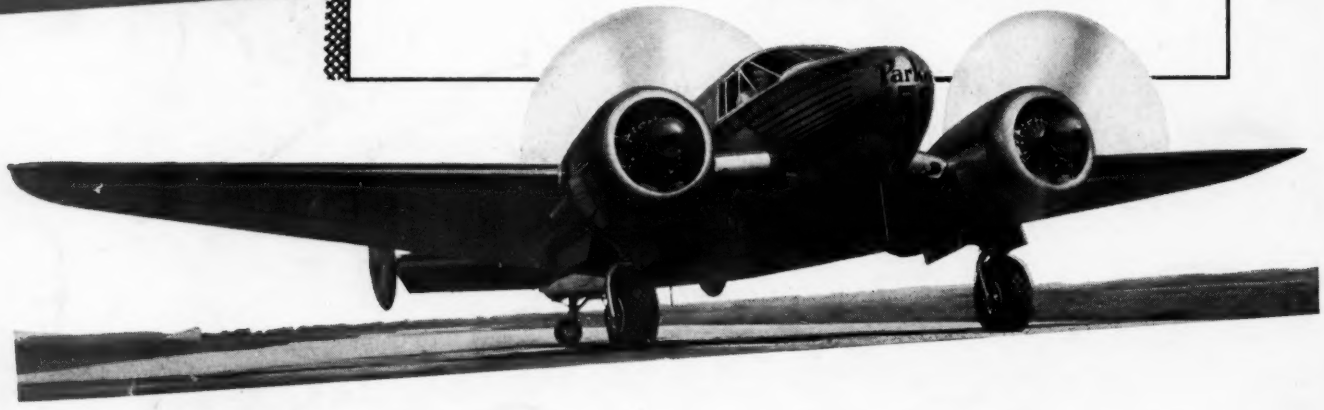

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